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Hydrography of the Faroe - Shetland Channel 1927 - 1952

By JOHN B. TAIT, D.Sc., Ph.D., F.R.S.E.

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PREFACE

The research described in the following pages aims, in the first part, to give quantitative expression to what is believed to be the major, large-scale, oceanographical influence in the commercial sea fishery regions of north-west Europe and, in the second, to elucidate and define in more precise detail than hitherto the several water-masses of different geographical origin which tend to converge on the Faroe-Shetland Channel, thus apparently making this region one of strategic importance, oceanographically, to the wider regions above-mentioned.

Apart from long-standing popular conception regarding the rôle of the so-called "Gulf Stream" off the north-western European seaboard in relation to atmospheric, or perhaps rather, climatic, phenomena—a matter which does not enter into this investigation—the interest to scientific fishery research of the warm and relatively salt current which flows northward past the British Isles, lies in the knowledge, still largely empirical, that this current fluctuates more or less greatly in its intensity of flow, both seasonally and annually, and consequently probably governs large fluctuations in the amounts of heat and perhaps other significant forms of energy which it brings into colder and fresher water latitudes, thus ultimately affecting in greater or less degree the commercial fisheries of these regions. It is, of course, obvious that such matters of correlation between one natural phenomenon and another cannot even begin to be investigated scientifically without the provision of basic factual information and the research herein reported is a contribution to that end.

Thousands of the necessary scientific observations have been collected at sea and for this costly and often highly uncomfortable occupation one is indebted to one's scientific colleagues and assistants over many years and to the officers and members of crews of research vessels.

Inevitably, errors of observation have been made, but, the work finished, it is a matter for gratification and due acknowledgement that such errors have evidently been so remarkably few. It is frankly admitted that a considerable number of observations were originally under more or less grave suspicion, but, as one outcome of a fair degree of observational intensity in the region concerned, the majority of these suspicious records not only conformed ultimately to rational explanation, but in a surprising number of instances constituted valuable pointers to new and sometimes unlooked-for conditions in the sea. Incidentally, also, by the very laws of chance, these same circumstances furnish an adequate reply to the advocacy (which tacitly begs the question, it may be observed) of only such a degree of observational intensity as will serve the immediate purposes of an investigation. *Qui peut dire?*

The observations dealt with in these pages are primarily those of temperature and salinity. The former are now obtainable with great accuracy instrumentally. The latter, also necessary in highly accurate measure, are dependent, however, upon skilled laboratory technique in routine chemistry. By the very number of the determinations to be made, the actual operation must be tedious in the extreme. All salinity determinations used in this work, except those taken from lists kindly submitted by colleagues in other countries, have been performed by the British Government Chemist, and the opportunity is welcomed of paying tribute to the great accuracy, it is believed, of each individual entry in the long lists of observations received from this authority during the past thirty years and more. There is an additional and most valuable advantage, not enjoyed everywhere, of having these determinations of salinity carried out by an independent authority, inasmuch as in these circumstances personal bias towards the anticipation of results is at least reduced to a minimum. One's impression is that perhaps not a little is owing to this factor for the emergence of at least some of those singular and unique records which, as above-mentioned, have proved invaluable in indication of oceanographical phenomena of greater or less moment.

As already indicated, some material used in this investigation was kindly put at my disposal by colleagues abroad. In particular, thanks are due to Dr. Å. Vedel Tåning, Director of Danish fishery and oceanographical research, for permission to include many observations collected in the Faroe-Shetland Channel by the Danish research vessel *Dana*.

Grateful acknowledgment is also made of the work of the late Mr. William Fraser of this Laboratory who prepared all diagrams for publication, and to the Director, Dr. C. E. Lucas, C.M.G., F.R.S.E., for his helpful criticism and advice.

J. B Tait.

Scottish Home Department,
Marine Laboratory,
Aberdeen.
August, 1956.

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HYDROGRAPHY OF THE FAROE-SHETLAND CHANNEL
1927-1952

ABSTRACT

More or less systematic observations of temperature and salinity, increasing in frequency and in number during the later years of the period, were made along two roughly parallel cross-sections of the Faroe-Shetland Channel between the years 1927 and 1952 inclusive, with the exception of the war period 1940 to 1945. The sections were traversed in contemporary pairs on twenty-two occasions, and singly—mostly the more northerly section—on twenty-five further occasions.

By experimentally confirmed adaptation, to suit the circumstances of the region, of the standard method of hydrodynamical computation based on Bjerknes's Circulation Theorem, the volume transport of the oceanic water-mass through each of these sixty-nine sections has been calculated in the unit of cubic kilometres per hour. Agreement between the assessments for the contemporary pairs of sections resulted in all cases save one in which, however, the disagreement is susceptible of rational explanation. A considerable range in the magnitudes of the assessments is demonstrated.

In the pre-war period only spring-summer observations were made. The years 1931 to 1936 inclusive, excepting 1932 for which no material is available, reveal a succession of relatively low oceanic volume transports after the highest values of the period, which were registered in 1929. The post-war group of years contain the two highest assessments of the whole investigation, one in mid-summer 1947, and one in mid-winter 1951, the latter being the maximum value recorded throughout. In those years for which both spring-summer and autumn-winter assessments are available, namely 1949 to 1952 inclusive, the latter are of greater magnitude than the former. In conjunction with the results of surface drift-bottle liberations, evidence is adduced which indicates that these post-war autumn-winter volume transports increased annually to a maximum in December 1951, and thereafter began to decline.

Similar indication of progressive marine climatic change over groups of consecutive years is forthcoming in respect of two further phenomena in the hydrography of the Faroe-Shetland Channel during the period of this investigation. In the fourth decade the oceanic water-mass of the uppermost layers of the Channel was infused with extra-Mediterranean (Gulf of Gibraltar) water, beginning as trace indications in 1930-1931, waxing to maximum concentration in 1933-1934, and waning to complete extinction in 1939. Similarly, in the later years of the fifth and the first years of the sixth decades, the bottom waters of the Channel (normally found to consist of a sub-zero temperature, uniform salinity, bottom Norwegian Sea water-mass) were invaded, and at maximum intensity of the phenomenon in 1949 and 1950 totally displaced by, first one and then a second type of Arctic water-mass. These derived from intermediate and surface or sub-surface layers respectively of the East Icelandic Arctic Current in the south-western region of the Norwegian Sea, and were characterised by salinity of the order of 34·85‰ to 34·89‰ in the first case, and 34·77‰ to 34·84‰ in the second.

A further and apparently relatively new phenomenon revealed by these investigations is that of the occasional existence in the deepest parts of the Channel of heavy, sub-zero temperature, oceanic water. This, by a fortunate illustration on a particular section, of the commencement of the process—as in the case also of the Gulf of Gibraltar water intrusion into the upper water layers—evidently achieves these greater depths in isolation from the upper main oceanic water-mass by cascading down the slopes of the Channel, the process being initiated by rapid differential cooling of a part of the oceanic mass by vertical or lateral conduction and by convection from adjacent cold water-masses.

Much evidence of turbulence, probably induced by the rugged topography of the sea floor on the one hand and by the convergence of different water-masses on the other, is implicit in the sectional illustrations of temperature and salinity distributions. One effect of turbulence which is more or less frequently encountered in the Faroe-Shetland Channel is inversion of density in the vertical water column, and yet another, in at least one particular case, is the suggestion of a horizontal sub-surface tortional current through the body of the oceanic water-mass.

In all these several phenomena the value and importance of intensive and systematic hydrographic observation is exemplified.

INTRODUCTION

Since the Norwegian meteorologist, Mohn (1887), pointed to the region of the Faroe-Shetland Channel as the gateway through which relatively warm and salt water from the North-Eastern Atlantic Ocean passes into the North, Norwegian, and Arctic Seas, this aspect of the region has assumed increasing significance both hydrographically and biologically.

This increasing significance of a region already noted for the pioneering oceanographical investigations of the *Lightning* and *Porcupine* Expeditions in 1868 and 1869 (Thomson, 1874), derives from three primary considerations, one of which has already been indicated. Although Mohn based his deductions in respect of the Faroe-Shetland Channel on material which by modern standards contains many inaccuracies, his conclusion in regard to the effective access of Atlantic Ocean water to "the Northern Ocean" almost entirely by the seaway between Scotland and the Faroe Islands has remained almost unchallenged; for while Helland-Hansen and Nansen (1909) point out that similar waters reach the Norwegian Sea from between Iceland and Faroe, and also by the west of Iceland, they affirm, nevertheless, that by far the greatest bulk of the northward oceanic excursion proceeds by way of the Faroe-Shetland Channel. In the years that have followed, the greater evidence that has accumulated has served mainly to enhance this affirmation, save in certain so far apparently isolated instances which fall within the scope of the investigation to follow.

The second consideration lies in the apparently predominant importance of the oceanic water-mass in north-west European seas, as compared with the respective influences of those other typical water-masses of different geographical origins which either continuously, or, from time to time, pervade these seas. These are, chiefly, the continental (mainly Baltic) and boreal or Arctic water-masses, and large-scale derivatives, by admixture, of two or all of these three main types. The investigation now reported upon, however, has revealed at least two more typical water-masses occasionally to be encountered in the Faroe-Shetland Channel.

Thirdly, and commencing with one of the outstanding results of the early pioneering investigations above-mentioned (Herdman, 1923, p. 55), there is now a mass of experimental and circumstantial evidence in regard to the sea and its inhabitants, pointing more or less strongly to the reality in this medium of the universal philosophical conception of environmental influence on the lives and habits of living organisms. It is arguable, both logically and factually, that this influence is probably more intimate, more decisive, and therefore of greater moment in the sea than on land and in the air, and while the following study, for reason given below, is initially concerned with only the inanimate physical environment of marine organisms, that is, with the sea itself, it is ultimately towards the elucidation of environmental relationships of marine life, which are believed to play more or less significant rôles in questions relating to the appearance, abundance, and perhaps also the standard or quality of that life, that the work is in fact directed.

The influence of the sea on its inhabitants can probably be regarded as of a twofold nature. On the one hand, inherent physical and chemical properties of the sea, such as its temperature, viscosity, turbidity, the substances dissolved in it, e.g., the nutrient salts, gases, etc., exert individually their respective influences on marine life. On the other hand, it seems not improbable, on the evidence available (Tait, 1952, pp. 92 *et seq.*), that there are some as yet undefined but significant relationships between the several water-masses, each as an entity, in a particular region, and the nature and abundance of the life in that region. As already remarked, it is the oceanic water-mass which would appear to be of greatest import in this respect in the seas around north-west Europe; hence, in conjunction with similar information as regards the indigenous and contingent livestocks, the obvious and necessary desiderata of detailed and, as far as possible, quantitative knowledge of this water-mass.

Oceanic influence in the North Sea, the Norwegian Sea and adjacent waters, has already been the subject of a number of investigations, the total outcome of which, however, is still very largely qualitative, or only quasi-quantitative in character. Most of these investigations have included the Faroe-Shetland Channel in whole or in part, and some have been limited to this region.

Mohn (1887), after its discovery by the *Knight Errant* (Thomson, 1880; Murray and Tizard, 1882), and *Triton* (Tizzard, 1883) Expeditions, following the indications of the *Lightning* and *Porcupine* Expeditions, established the significance of the Wyville Thomson Ridge as the threshold of the northern seas to the main influx of oceanic water thereto. He also described the contrary invasion of the deeper levels of the Channel by cold, less saline water from the Norwegian Sea.

The first deliberate hydrographic survey of the Channel region was carried out as part of a wider, international scheme—the first of its kind in oceanographical investigation—in the year 1893. Reporting on the region mainly between the Faroe Islands and Shetland—the area over the Wyville Thomson Ridge was not included—Dickson (1894) found little to add to the general conception which he describes as having long been current knowledge, namely, that oceanic water, overriding cold and less salt Norwegian Sea water in the deepest parts of the Channel, enters the North Sea by way of the north and south of the Shetland Islands. As pointed out by Helland-Hansen (1905), however, deficiencies and inaccuracies in the original observational material and in the methods used, preclude, as in Mohn's case, the acceptance of much of the hydrographic detail cited by Dickson in this and a subsequent report (1897) on similar work in the Channel in 1896. From a later intensive study of monthly surface temperature and salinity distributions over practically the whole of the North Atlantic Ocean, Dickson (1901) deduced seasonal variation and annual fluctuation in the flow of the Atlantic Current, which he called the Norwegian branch of the European stream, through the Faroe-Shetland Channel.

With the introduction, early in the present century under the auspices of the newly established International Council for the Exploration of the Sea, of improved instruments and methods of investigation, more confident realisation of events in the Channel began to take shape from the year 1902 onwards. Commencing with Helland-Hansen's report (1905) on observations of temperature and salinity taken across the northern part of the Channel between Shetland and the Faroe Islands in August and December 1902, and continuing through the several reports by Robertson (1905, 1907, 1909, and 1913), for the same region in respect of the years 1903 to 1910 inclusive, the broad but firm conception evolved of a permanent current of oceanic water from the North-Eastern Atlantic Ocean, flowing in general direction north-eastward through the Faroe-Shetland Channel towards and into the Norwegian Sea, with offshoots into the North Sea round the north and south of Shetland. And although, as has already been mentioned, oceanic waters were found also to attain at least to the south-western limits of the Norwegian Sea by other routes, these latter incursions were conceived as being on the whole relatively insignificant compared with that through the Faroe-Shetland Channel.

At its ingress to the Channel over the Wyville Thomson Ridge, the Atlantic Current is an upper water phenomenon, breaking surface over a wide area and defined in depth by the depth of the Wyville Thomson Ridge. Its course, as it tops the Ridge, changes more or less abruptly from north-easterly to easterly, and even to some extent on occasions to south-easterly. This it does under three combined influences, namely, Ekman's (1923) topographic and planetary rotational effects in the northern hemisphere, and that of a subsidiary convergent oceanic inflow directed eastwards into the Faroe-Shetland Channel round the northern boundary of Faroe Bank. By reason of its depth, however—approximately 300 fathoms—the Atlantic Current on its easterly to south-easterly course, impinges, below 100 fathoms depth, on the continental shelf defining the eastern margin of the Faroe-Shetland Channel proper. Again more or less abruptly its course here swings back to a north-easterly direction, following the 100-fathoms bathymetric contour west of Shetland, and so into the Norwegian Sea.

Westward of the main Atlantic Current on its north-easterly course between Shetland and Faroe (much nearer to the former than the latter), is normally to be found other slightly less saline and cooler oceanic water making a southerly course along and off eastern Faroe shores. This Atlantic water has, as it were, by-passed the Faroe Bank and the Faroe Islands on their western sides and, in the region to the north of Faroe, has mixed to some extent with East Icelandic Arctic water before proceeding to circumnavigate the Faroe group, as is so clearly indicated by the evidence of surface drift-bottle results (Tait, 1937, p. 53). Indeed, the picture of the surface currents of this region and of the northern North Sea which has been evolved from the analysis of numerous surface drift-bottle records, affords an invaluable aid in the interpretation of at least uppermost water temperature and salinity distributions, and of the immediate derivations of the waters which these distributions represent. Witness also the conditions normally encountered on the other, the southern, side of the main Faroe-Shetland Channel oceanic current. Salinity distributions here also signify as a rule somewhat diluted oceanic water, and from the surface current chart above-cited the obvious source of dilution are the waters from the west Scottish coastal region.

As is to be expected, however, in dealing with a fluid medium in continuous motion, subject to the physical laws of action and reaction arising from the natural forces acting in and upon it, numerous modifications and complications have been superimposed upon the foregoing basic conception of the Atlantic Current in the Faroe-Shetland Channel. The current itself, for instance, as has been suggested by several investigators (Helland-Hansen, 1905; Helland-Hansen and Nansen, 1909; Robertson, 1905, etc.; Knudsen, 1911; and others), probably does not pursue a continuously progressive course from the North-Eastern Atlantic Ocean to the Norwegian Sea, even along the undulatory path described above, but may be more accurately conceived as the resultant progression of a water-mass embodying much turbulent and vortex motion in varying degrees of complexity. Even so, however, certain large-scale changes have been shown to underlie these complexities.

Comparison at different times of the year, for instance, of the inherent characters of the oceanic water-mass—its temperature and salinity particularly—has apparently established the underlying general principle that these (not alone in surface waters under atmospheric influence, but also, although on the whole less so, in the body of the current) vary seasonally between maxima in spring or early summer as a rule and minima in autumn or the beginning of winter. Aberrations, large or small, occur in the incidence of these cyclic phases from year to year as well as in their magnitudes. The first evidence of this sort, referring essentially to the northern North Sea, but probably embracing also the Faroe-Shetland Channel, occurred in the autumn of the year 1905, when an *accession* to, instead of the expected recession of, the oceanic influence was observed from temperature, but more especially salinity, distributions (Robertson, 1907). Indirect evidence of the kind of aberration to which seasonal variation in the oceanic influence appears to be subject has also been deduced from the drift-bottle results of several years' experiments (Tait, 1937, and 1952, pp. 96-97).

Superimposed on the above seasonal variations in the characteristics of the oceanic factor in the hydrography of north-west European seas, are fluctuations as between corresponding seasons of successive years, pointing, some of them, to the possibility of their association in longer-term, although not necessarily cyclic, phenomena. Of such a nature, as was then pointed out, might be the phenomenal increase in the magnitudes and also in the incidence of high salinity values observed in the northern North Sea in the years 1931 to 1934 inclusive (Tait, 1935). The present report, as will be seen, throws additional and new light upon this particular phenomenon.

Save in the matter of the velocity of the current, however, from which, in a loose association with the distributions of its characteristic properties, the quasi-quantitative idea of its intensity of flow has evolved, little in the way of precise measurement of these variations and fluctuations has hitherto been attempted. Despite the inherent inaccuracies of his material, Mohn (1887) calculated the superficial rate of flow of the oceanic current into the Norwegian Sea *via* the Faroe-Shetland Channel as of the order of 7½ to 10¾ nautical miles per day, magnitudes which are still among those derived by modern methods.

By adaptation of the heterogeneous (baroclinic) fluid Circulation Theorem of V. Bjerknes (1898 and 1901), Nansen (1902), Sandström and Helland-Hansen (1903), and finally Helland-Hansen (1905), on the basis of certain modifying assumptions, furnished the means of calculating from the distribution of density in the sea the relative horizontal velocities of flow at different depths and, of course, where the velocity at a particular level is known, or can with reasonable safety be assumed, of deducing therefrom the absolute velocities at all depths above and below the reference level.* Absolute velocity data for particular levels in the sea are seldom available and in the absence of such a datum the reference level which is normally selected for the translation of relative into absolute velocities is that in which the horizontal pressure gradient, and therefore horizontal velocity, is, or can be assumed to be, zero.

On this foundation, a number of calculations are available in respect of the relative velocities down through the oceanic water-mass in the Faroe-Shetland Channel, as also tentative estimates, on the basis of assumed zero velocity at a given depth, of absolute velocity, generally at the surface where the current

*See also Hachey (1934), Harvey (1928, pp. 122-130), and Smith (1926).

may normally be presumed to flow most strongly. Thus, Helland-Hansen (1905) estimated the maximum superficial velocity of the Atlantic Current west of Shetland to be about 10 nautical miles per day in August 1902, and somewhat less in December of the same year. For the ensuing years, Robertson (1905, 1907, 1909, 1913) tabulated relative velocities between Shetland and Faroe in both northerly and easterly directions where he conceived the current, from temperature and salinity distributions, to be flowing in these directions. Helland-Hansen and Nansen also (1909, p. 160), tabulated the surface velocities of the Atlantic Current in the eastern part of the Faroe-Shetland Channel in the months of May and August in each of the years 1903 and 1904, showing apparently identical velocities in the corresponding months of these two years, namely 14 nautical miles per day in May and 9 nautical miles per day in August. Such measurements may be said to have culminated in the intensive hydrographical and hydrodynamical survey of the Faroe-Shetland region undertaken in May 1924, by a Scottish and a Danish research vessel working together. The results, reported by Jacobsen and Jensen (1926), focused in sharp relief the indications of previous surveys, establishing the complexity of water movement in the Channel region, but did not destroy the basic conception outlined above.

These measures of velocity, however, useful though they are, do not afford that tangible conception of the *quantitative* influence of the oceanic water-mass which seems necessary for consideration in relation to biological phenomena which may be subject to it and its fluctuations, or influenced by it in greater or less degree, directly or indirectly. Their magnitudes, as Helland-Hansen (1905) pointed out, not only in the surface, but generally down through almost the entire water-mass, indicate that the quantities of water borne by the current in the Faroe-Shetland Channel may be so enormous that "tidal currents and casual wind currents may then be disregarded."

From a rough calculation, Helland-Hansen (1905) put the volume of oceanic water "carried away" by the Atlantic Current in the Faroe-Shetland Channel in August 1902, at approximately 4 million cubic metres per second (14½ cubic kilometres per hour). For May and June 1904, Helland-Hansen and Nansen (1909, p. 169) deduced the corresponding figure of 4·5 million cubic metres per second (*ca.* 16 cubic kilometres per hour) for the same region, with progressively lesser values for the intensity of the current on sections in the Norwegian Sea normal to the Norwegian coast between about latitudes 62°N and 68°N. Gehrke's (1907) value of practically 2 million cubic metres per second for the Atlantic Current in the south-eastern part of the Faroe-Shetland Channel region, north-westward from the Scottish north coast, being derived on the basis of Knudsen's hydrographical theorem (1900) which yields velocity values less than those calculated from the Bjerknes theory, is scarcely comparable with the foregoing. Later, however, Helland-Hansen (1934), with due qualifications in respect of the method of computation used—part of it for the first time in this paper—and of the premises and conditions attached, cited figures equivalent to 10 and almost 12 cubic kilometres per hour for the "intensity" of the Atlantic Current through "The Sogne Fjord Section" in the southern reaches of the Norwegian Sea beyond the mouth of the Faroe-Shetland Channel, at the end of the month of May in the two years 1927 and 1929 respectively.

Finally, embracing most of the hydrographic sections accomplished between 1902 and 1939 across the northern and middle part of the Channel, Jacobsen (1943), by certain modifications of the Bjerknes theory, derived two sets of intensity figures, the so-called 'corrected" values being based on an assumed zero-current level at 800 metres depth at the deepest stations, and at the bottom at shallower stations. These values range from a minimum of $-2{\cdot}7$ to a maximum of 21·8 cubic kilometres of Atlantic water per hour. Two approximately parallel sections were involved at a distance of from 50 to 60 miles apart. These sections were worked more or less simultaneously on twenty occasions, involving the months from April to December, omitting only September and October. On only seven occasions, however, do the "corrected" intensity values for the two sections approach agreement with each other. In the remaining thirteen instances the differences are so great—to between 13 and 16 cubic kilometres per hour in two cases—as to preclude unqualified acceptance of the values themselves. Similar "corrected" values for a single section between Faroe and Shetland in August 1946, July 1947, and August 1948, have been cited by Smed (1948) and Hermann (1949a and b) respectively.

It is material to note at this juncture, in view of earlier pronouncements by Helland-Hansen and Nansen (see p. 2), that in the last mentioned report Hermann (1949b) found from his calculations for

August 1948 that the inflow of oceanic water to the Norwegian Sea by the west and north of the Faroe Islands was apparently of approximately the same magnitude as the inflow through the Faroe-Shetland Channel at this time.

Jacobsen himself, however, characterized his values for the individual sections as "of small significance on account of uncontrollable factors such as wind and tide." An attempt to eliminate such factors by averaging the temperature and salinity observations for each section within quarterly groups, the first quarter of the year being unrepresented, led to better agreement between the intensity values for the two sections, but only for the second and third quarters of the year. The circumstance that each of the two sections was represented only thrice in the fourth quarter may account in some measure for the relatively large discrepancy noted for that period, namely, from 2·7 Km^3/hr. for one section to 8·0 Km^3/hr. for the other.

Nevertheless, there can be little doubt that, if not in the course of a single year, at all events as between the corresponding calendar periods of successive years, the intensity of flow of the oceanic water-mass in the Faroe-Shetland Channel is liable to more or less considerable fluctuation. Translated into their equivalents of, say, heat or other characteristics of biological import, it is evident that such fluctuations can reasonably be anticipated also to be of biological significance. The obvious desideratum is, of course, to achieve sufficiently reliable measures, with sufficient frequency, of the intensity of the oceanic influence.

Accepting that, at the present stage of oceanographical knowledge, the best quantitative measure of intensity is that which is furnished by computations of volume- or mass-transport of the water-mass concerned through "sections" of hydrographic stations, it is at once to be recognised that, despite the highest accuracy of the original observational material, the methods of dynamic computation normally employed are based on a theory which depends for its validity in practice on certain limiting conditions, and which cannot as yet be applied in its complete form. Thus, a computation which is based on the observations of a single section must always, especially where the precise datum of an accurately known velocity at a definite depth on the section is lacking, be accompanied by an element of doubt as to its accuracy.

Another factor which, according to Defant (1950), may, without deliberate measures taken to compensate it, prejudice these dynamical computations, is that of the effects of internal waves on the distributions of temperature and salinity along hydrographic sections as normally traversed. (See also Seiwell, 1939, who cites other authorities in this connection). No such measures were taken in the following investigation. On the other hand (Sverdrup, Johnson, and Fleming, 1942, p. 592), the effects concerned, especially in the Faroe-Shetland Channel (Helland-Hansen, 1930), are evidently so closely connected with tidal phenomena that subsectional positive and negative computational anomalies which may arise from internal wave movements may be expected to be more or less compensated from one end to the other of a section which has occupied a whole multiple of the semi-diurnal or diurnal tidal period. In any event, the investigation now reported deals essentially with the broad, aggregate, "main feature(s) of the flow pattern," to quote Seiwell, which, notwithstanding such errors as there may be on the above account in the *details* of computation, "can be considered fairly trustworthy."

The research is presented, therefore, with confidence in its results which contain a measure of mutual confirmation and, in the majority of instances, are supported by additional information also of a quantitative character.

PART ONE

THE INTENSITY OF THE ATLANTIC CURRENT

Basis of the Investigation

For other than the immediate purpose now to be served, a new hydrographic section of seven stations between the Butt of Lewis and the north-east corner of Faroe Bank, passing thus obliquely across the middle of the Wyville Thomson Ridge, was introduced by the Fishery Board for Scotland in 1927 to its operational research programmes. The object then was to achieve a cross-section of the Atlantic Current as it entered the Faroe-Shetland Channel and before its waters became affected by encroachments of East Icelandic Arctic and Norwegian Sea waters from the north of Faroe, as had become evident on the more northerly hydrographic section habitually worked between Faroe and Shetland. The more northerly section continued also to be worked, often in conjuntion with the new one.

The choice of the new section would appear to have been fortunate also in the present connection. It was originally and deliberately laid as nearly as could be estimated at right angles to the course of the Atlantic Current. When the question came to be considered of a reliable quantitative assessment of the oceanic influence in north-west European seas, attention at once focused for the commencement of such an investigation on the Faroe-Shetland Channel through which, according to most authorities, by far the major and most significant part, if not practically the whole, of the effective oceanic influx to these seas takes place. Logically, also, the threshold to the region from the North-Eastern Atlantic Ocean seemed to be the obvious starting-point, not only on account of the relative purity of the oceanic water-mass at this location, but also because, here, one of its primary dimensions, namely its depth, or thickness, is approximately known at the outset. From British Admiralty Charts the mean depth of the Wyville Thomson Ridge can be estimated at about 550 metres. The same figure was deduced by Robertson (1905, p. 62). It seems clear, therefore, that of the total bulk of oceanic water approaching the Ridge from the south to south-west, only that part of it which stands above about 550 metres passes on into the Faroe-Shetland Channel. This is the first assumption to be made in the following investigation. It is accepted also that almost if not quite the entire oceanic water-mass which subsequently affects north-west European seas passes between the Butt of Lewis and Faroe Bank and is therefore, in the main at least, comprehended by the hydrographic section between these two positions which was instituted in 1927. For the purpose of hydrodynamical computation of the intensity of the oceanic incursion through this section it is further assumed, on account of the presumed effect of the Wyville Thomson Ridge on the Atlantic Current as it impinges on and passes over it, that the horizontal velocity of the Current is zero along the summit of the Ridge, i.e., at a mean depth of 550 metres beneath the sea surface.*

Because of the known limitations of the hydrodynamical method on account of these and other assumptions entailed in its application (see below), it would clearly be desirable to have, if possible, at least some measure of corroboration of the intensity values derived on the above basis. As already mentioned, the new hydrographic section between the Butt of Lewis and Faroe Bank was traversed as often as possible in conjunction with a section between Faroe and Shetland, also laid as nearly as could be judged at right angels to the flow of the Atlantic Current in this region as it is about to emerge from the Faroe-Shetland Channel into the Norwegian Sea. Provided, therefore, that no considerable dissipation of the oceanic water-mass occurs between the threshold of the Channel and its debouchment into the Norwegian Sea, there might reasonably be expected to be more or less close correspondence between values of its volume transport across the two sections laid respectively in these two regions.

For the actual evaluation of oceanic volume transport through the more northerly section, circumstances are of course different from those between the Butt of Lewis and Faroe Bank, there being no

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*See Appendix I.

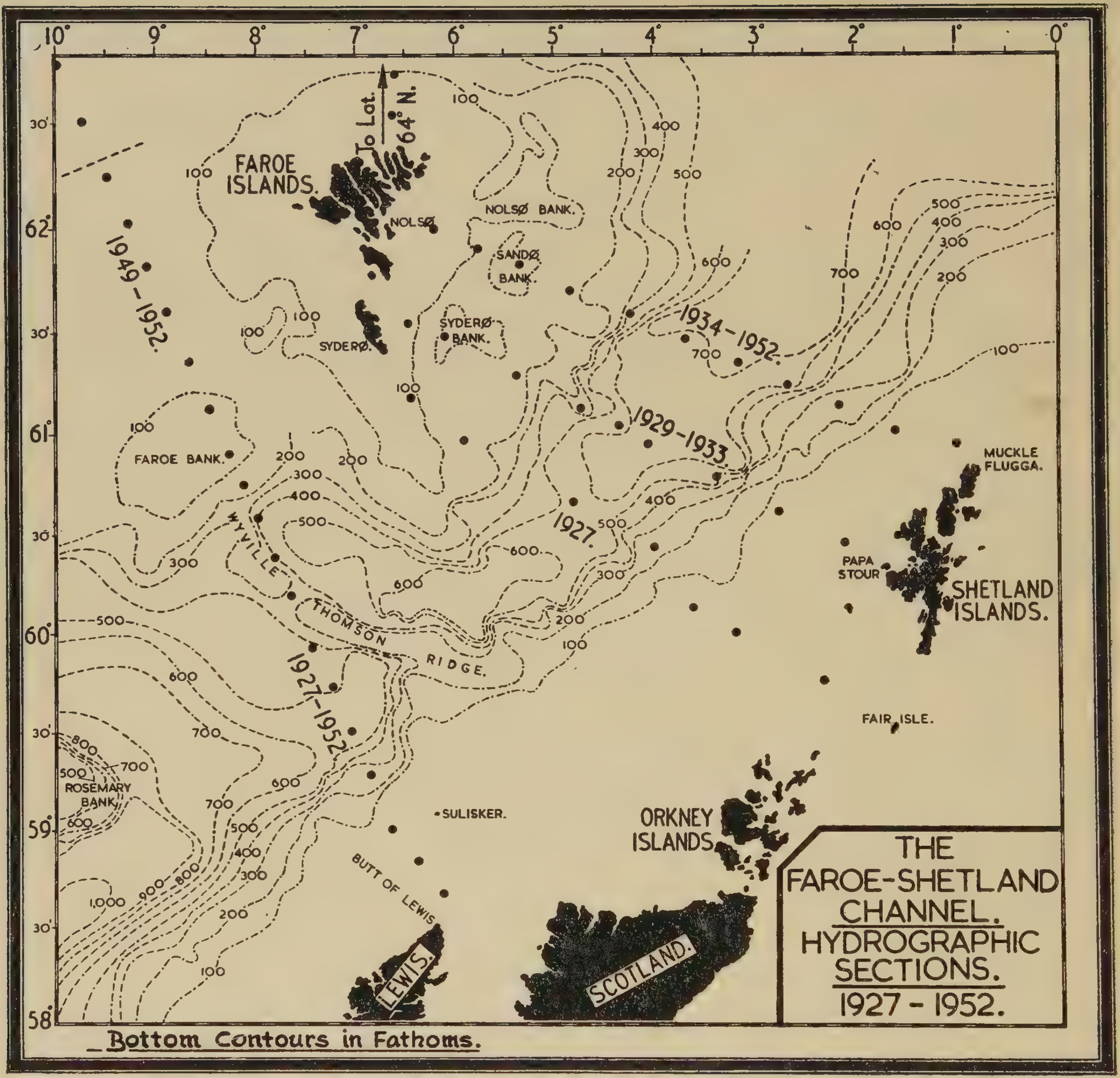
10°
9°
8°
7°
6°
5°
4°
3°
2°
1°
0°
62°
61°
60°
59°
58°
30'
To Lat. 64° N.
FAROE ISLANDS.
NOLSØ
NOLSØ BANK.
SANDØ BANK.
SYDERØ BANK.
SYDERØ.
FAROE BANK.
WYVILLE THOMSON RIDGE.
ROSEMARY BANK.
SULISKER.
BUTT OF LEWIS.
LEWIS.
SCOTLAND.
ORKNEY ISLANDS.
FAIR ISLE.
PAPA STOUR
SHETLAND ISLANDS.
MUCKLE FLUGGA.
1949–1952.
1934–1952.
1929–1933.
1927.
1927–1952.
100
200
300
400
500
600
700
800
900
1,000
THE FAROE-SHETLAND CHANNEL. HYDROGRAPHIC SECTIONS. 1927 - 1952.
Bottom Contours in Fathoms.

FIG. 1

convenient submarine elevation between Faroe and Shetland defining the thickness of the oceanic water-mass in its further progress northward or north-eastward. On the other hand, there is in this more northerly region the known situation of two characteristically different water-masses lying one above the other and moving in approximately contrary directions. It may be inferred, therefore, that a zone or interface of zero horizontal motion probably lies somewhere between them. Three considerations indicate where this zone of zero horizontal potential may occur.

1. In the construction to scale of a large number of representative vertical sections, illustrating in cross-section the distributions of temperature and salinity between Shetland and Faroe, it has been observed that, from the surface downwards, isotherms and isohalines entered at unit intervals tend in the great majority of cases to crowd together towards the generally undulatory 35·00‰ isohaline. According to Pettersson and Ekman (1891, p. 37), this isohaline may be taken to define the lower boundary of the oceanic water-mass. Beneath it, within the body of what is regarded from its characteristics of temperature and salinity as essentially comprised of bottom Norwegian Sea water, the equilines tend to space out again.

2. Jacobsen (1943), in his discussion of the basis of current investigation in the Faroe-Shetland Channel by hydrodynamical computation, namely, the level or surface of zero potential gradient or current, remarks that, "actually the zero surface may change its place from time to time."

3. Helland-Hansen and Nansen (1909, p. 163) recount that direct current meter measurements at several depths from surface to bottom in the position, latitude 62°50′N, longitude 4°45′E approximately, in July, 1906, "demonstrated a minimum of velocity at about 70 metres, just at the level of the isohaline of 35‰."

The assumption, therefore, on the hydrographic section between Faroe and Shetland, of the 35·00‰ isohaline as coincident with the level of zero current at right angles to the section would seem to be justified, at least as a first approximation.* The effect of the assumption on the results obtained in relation to the oceanic incursion through the Faroe-Shetland Channel is amply illustrated in the following investigation.

The Observational Material and its Treatment

Before referring to other features of Figure 1, mention may be made here of an interesting discovery recently made known regarding the bottom topography of the region under investigation. It will be observed from Figure 1 that from what may be called the "toe" of the Faroe-Shetland Channel, the rise of the sea floor to less than 200 fathoms from more than 500 fathoms is represented as being fairly steep. The 200-fathom contour, however, has not been closed. This is because the Faroe Channel is now known to extend to the north-west and to completely sever the Faroe Bank from the shelf around the Faroes." The quotation is from a recent essay by A. H. W. Robinson (1952) on "The Floor of the British Seas", in which accumulated information due to the development of sonic sounding methods is collated. A portion of Robinson's illustration showing the cleavage between Faroe Bank and the Faroe Shelf is reproduced in Figure 1a.

In addition to the two main sections already mentioned, which are the basis of the following study, those other sections which have been worked from time to time by the Scottish research vessels *Explorer* and *Scotia* in and immediately adjacent to the Faroe-Shetland Channel proper, are shown or indicated in Figure 1. Additional sections, accomplished by the Danish research vessel *Dana* and by kind permission included in this investigation, have all, except in one instance, coincided in whole or in part with the section shown between Nolsø, Faroe, and Muckle Flugga, Shetland. In the single instance referred to, *Dana*, in June 1948, covered the major part of the Faroe Bank to Butt of Lewis section, terminating however off the island of Sulisker instead of in the vicinity of the Butt.

*See Appendix I.

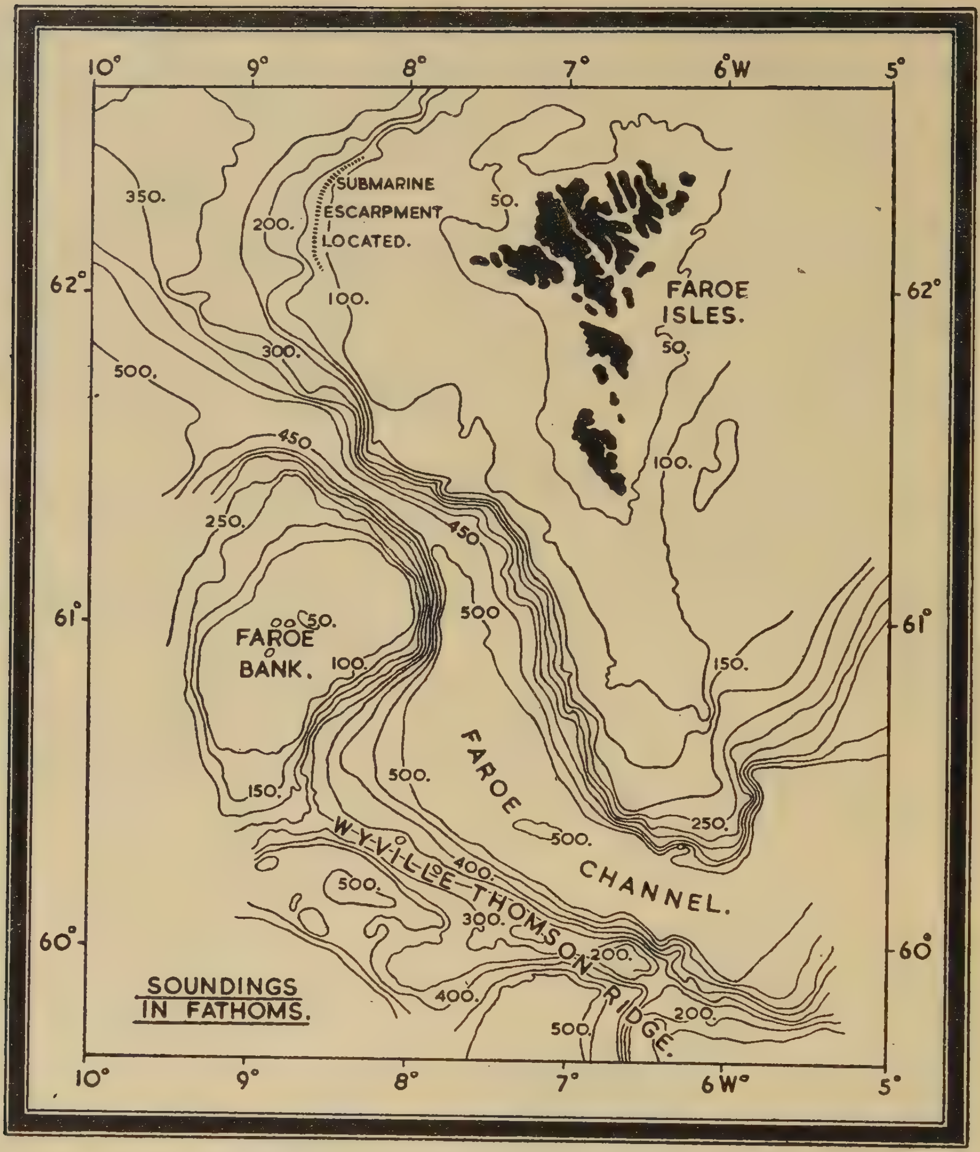
10°
9°
8°
7°
6°W
5°
62°
61°
60°
SUBMARINE ESCARPMENT LOCATED.
350.
200.
50.
100.
FAROE ISLES.
50.
300.
500.
450
100.
450
250.
500
FAROE BANK.
50.
100.
150.
150.
FAROE CHANNEL.
500.
250.
500.
WYVILLE-THOMSON RIDGE.
400.
500.
300.
200.
400.
200.
500.
SOUNDINGS IN FATHOMS.
10°
9°
8°
7°
6W°
5°

Fig. 1*a* Submarine valley between Faroe Bank and the Faroe Islands shelf (after Robinson, 1952).

As will be observed from Figure 1, the more northerly section since 1927 has been laid progressively farther north until in more recent years it has become established in the position illustrated. In the same period also the number of stations on each section has been increased, from seven to eleven on the northern section and, to the north-east corner of Faroe Bank from the Butt of Lewis, from seven to twelve. Occasionally this southern section has been extended north-westward over Faroe Bank to beyond latitude 62°N and longitude 9°W. Latterly, in the years since 1949, an additional short section has been laid due north of Faroe on longitude 6°35′W, at first only to latitude 63°30′N, but subsequently to latitude 64°N. The purpose of this section, only the two southmost stations of which are included in Figure 1, was to cross that part of the oceanic water-mass which entered the Norwegian Sea by the west and north of Faroe. Circumstances, however, have prevented this section being completed on more than a few occasions.

Before 1949, with only a single research vessel at disposal, it was impracticable to visit the Faroe-Shetland region more than once in each year, but in each of the four years 1949 to 1952, with increased resources, several traverses of at least the two main sections were accomplished. As often as possible these two main section were worked closely following upon each other, but sometimes only one of the two sections could be completed. It is these completed main sections, from the Butt of Lewis to Faroe Bank and from Shetland to Faroe, which form the foundation of the present investigation, the single sections intermediate in time between the paired sections more or less usefully linking the latter in their interpretation.

At each station the observations taken were those of temperature and salinity, at most, and in some cases all, of the standard depths laid down by the International Association of Physical Oceanography (1937) for oceanographical surveys of this kind.

In the earlier years, depth registration by the use of unprotected reversing thermometers was not practised but, fortunately, the research vessel *Explorer* then employed in these surveys had the advantage of relatively easy manœuvrability on station in relation to the line on which the water sampling bottles and thermometers were suspended. Error due to wire angle, therefore, is probably in the majority of *Explorer* records relatively small.

Water samples for salinities down to 150 or 200 metres were normally taken by means of the Pettersson-Nansen insulating water-bottle, the associated temperature observations being obtained by the accompanying Nansen thermometer graduated in 0·1°C from about −2°C to +18°C or +20°C, each thermometer having a scale-correction schedule from the national or state physical laboratory of the country—Germany or Great Britain—in which the thermometer had been manufactured.

Below 200 metres, water samples were collected by reversing water-bottle, these being used in series up to five or six according to circumstances. To each bottle a pair of similarly graduated (i.e. in 0·1°C) and tested reversing thermometers was attached. Unprotected reversing thermometers, when these came to be used, and when supplies were sufficient, were normally mounted along with the paired protected thermometers in the lowest bottle of each series and in at least one intermediate bottle. Sometimes, on account of shortages, only one unprotected reversing thermometer could be used. Considerable wire angles, up to over 40° in some few instances, were experienced from the research vessel *Scotia* which began to operate in 1949.

All hydrographic winches on the Scottish research vessels, since 1938, have been associated with the Kemp pattern of compression-spring compensated davit (Ardley and Mackintosh, 1936), as first employed on the *Discovery II* expeditions in the Southern Ocean. All thermometer readings have been made with the aid of a telescopic magnifying lens fitted with a device for the avoidance of parallax error in reading.

All salinity determinations were performed at the Government Chemist's Laboratory in London by the Mohr-Knudsen method (Oxner and Knudsen, 1920; Thomsen, 1948), using secondary standards made up at the Government Laboratory in place of the hermitically sealed glass tubes of "standard" or normal" sea water (Knudsen, 1903, 1925; Jacobsen and Knudsen, 1940) supplied by the Oceanographical Laboratory of the International Council for the Exploration of the Sea in Copenhagen. The interval between collection of the sea water samples and their examination in London averaged generally from 2½ to 3 months but sometimes extended to nearly eight months. The storage bottles however were of hard glass repeatedly soaked for prolonged periods in from boiling to cold water before being put into service and sealed with rubber-ringed highly glazed porcelain stoppers on a stout wire swivel spring clip. It is not thought from a former investigation of the question (Tait 1935) that any material error arises from the storage of the water samples before examination. As found by Helland-Hansen and Nansen (1926) in the North-Eastern Atlantic Ocean apparently anomalous salinity values occur with fair frequency in the Faroe-Shetland Channel region and in all but a few cases there is insufficient reason to discard them on account of their anomaly. They do in fact, as will be revealed in the following, play a material part in this research, providing, in the outcome of the investigation as a whole, additional evidence in favour of their reality.

The raw material of temperature and salinity observations thus assembled, the first step in its processing was the correction of the temperature readings for scale and adiabatic error. For the Nansen thermometers the former was done by means of simple curves drawn from the data given for each thermometer on the appropriate national physical laboratory test schedule, and the latter by reference to Ekman's (1905) table of adiabatic corrections for sea water and the Pettersson-Nansen water-bottle. Corrections to protected reversing thermometer readings were similarly performed from curves, one for each thermometer, constructed on the basis of Sund's formula (1926):—

$$K = \left\{ \frac{(T-t)(T+v)}{6100} + I \right\} \left\{ 1 + \frac{(T+v)}{6100} \right\}$$

where T and t are the readings of the main and the auxiliary thermometers respectively, the latter corrected for index error, v is the volume (engraved usually on each thermometer) of mercury to the zero mark, I is the index correction of the main thermometer, and 1/6100 is the combined coefficient of thermal expansion of mercury and of the glass from which the thermometer is manufactured, designated Jena glass, $59^{\underline{\text{III}}}$

Corrections to the readings of unprotected reversing thermometers were applied according to the formula given by Soule (1944, p. 19):—

$$K = \frac{(T^1+v)\,(T_w-t)}{6100} + I$$

where T^1 is the reading of the main thermometer, T_w is the temperature of reversal as determined by the protected thermometer, the other symbols having the same meaning as before.

Then came the determination of densities (σ_t) at the levels of the associated salinity and (now corrected) temperature observations. These were mostly performed by means of Sund's Oceanographical Slide Rule (1929), but, for convenience in a large number of instances, by enlarged reproductions of Kalle and Thorade's graphs (1940).

At this stage the depths of reversal of certain of the reversing water-bottles were determined from the corrected protected and unprotected reversing thermometer readings by the formula (Soule, 1944):—

$$D = \frac{(T_u - T)}{Q\rho m}$$

where D is the depth in metres, T_u the corrected reading of the unprotected reversing thermometer, T the mean of the corrected readings of the two accompanying protected reversing thermometers, ρ_m the mean specific gravity of the water column above the reversed thermometers, and Q the "pressure constant" of the unprotected thermometer, or the change (in degrees) of the corrected unprotected thermometer reading produced by a change of pressure of one-tenth kilogram per square centimetre. Q is given on each thermometer test schedule, usually in the form of the number of degrees change in the reading per kilogram per square centimetre change in pressure. ρ_m was calculated from the mean σ_t of the water column by Hesselberg and Sverdrup's tables (1915), referring to the formula:—

$$\rho = 1 + 10^{-3}\sigma_t + \epsilon_D + \epsilon_{SD} + \epsilon_{tD}$$

D signifying depth and S, salinity.

For the deduction of the depths of reversal of intermediate water bottles to which only protected reversing thermometers were attached, one of two graphical methods was employed according as the maximum recorded depth to be adjusted was, by metre-wheel registration, greater or less than 900 metres. For depths of 900 metres or less it was convenient merely by circular arc to set off on millimetre-squared paper the thermometrically determined depths against a vertical scale of metric depth, to draw a smooth curve through these determined points and the point of origin, and on this curve to cut off by circular arc the adjusted depths appropriate to the intermediate metre-wheel registrations. Where the maximum depth was greater than 900 metres, the difference method described by Pollak (1950) was used.

It was now necessary to adjust back, as it were, to the standard depths at which by metre-wheel registration they were presumed to have been taken, the temperature and salinity observations, together with the density data derived from them, belonging properly to the above thermometrically determined and deduced depths. This was done by the graphical method described by Helland-Hansen (1926, p. 17) and by Helland-Hansen and Nansen (1926, p. 8) for the interpolation of observations, with due attention to the necessity for mutual agreement among the three characters at each level.

From the material treated and assembled as above, vertical section diagrams (Figures 8-81), showing the vertical distribution of temperature and salinty, were constructed.

For purposes of calculation of volume transport and horizontal velocities, the next step in processing the data, thus far corrected and adjusted, and σ_t computed, was the computation of anomalies of specific volume (δ) and thence of dynamic depths (ΔD) at each hydrographic station on the two main sections above defined across the Faroe-Shetland Channel.

Specific volume anomalies were computed from Sverdrup's tables (Sverdrup, Johnson and Fleming, 1942), based on his formula (1933):—

$$\delta=\Delta_{st}+\delta_{sp}+\delta_{tp}+\delta_{stp}$$

where

$$\Delta_{st}=\delta_s+\delta_t+\delta_{st}=0{\cdot}02736-\frac{10^{-3}\sigma_t}{1+10^{-3}\sigma_t}$$

and in which the last term, δ_{stp}, being so small, can always be neglected, so that in practice

$$\delta=\Delta_{st}+\delta_{sp}+\delta_{tp}.$$

Dynamic depth anomaly in computation depends on the relation

$$\Delta D=\int_{p_1}^{p_2}\delta dp$$

(see Sverdrup, Johnson and Fleming, 1942, pp. 408-409).

For the further computation necessary for volume transport calculations, Jakhelln's (1936) formulae were the guide.

Jakhelln writes, on the basis of a known level of zero horizontal velocity,

$$V=\frac{10}{\lambda}(Q_A-Q_B)\ m^3/\text{sec}$$

where V signifies the volume transport above the "zero" level, z_1 between two stations A and B, $\lambda=2\omega\sin\varnothing$, ω being the angular velocity of the earth's rotation and $\varnothing$ the mean geographical latitude of the two stations. The quanity Q is defined by the relation,

$$Q=D_1z_1-\int_0^{z_1}Ddz,$$

D being dynamic depth, and z the depth in common metres. As Jakhelln points out, D and Q may be replaced in these formulae by their anomalies, ΔD and ΔQ, which are computed.

Similarly, the velocities at the standard levels down to the zero level (z_1) between each successive pair of hydrographic stations along each section, were computed according to Helland-Hansen's (1905) well-known formula:—

$$v-v_1=\frac{10}{\lambda L}(\Delta D_A-\Delta D_B)$$

in which $v_1=0$ at z_1 metres, L is the distance in metres between the two stations A and B.

It remains to cite the following practical details relative to the level of zero current assumed between each pair of hydrographic stations:—

1. On both sections, between stations situated on a shelf, slope, or bank, and where the entire water column at both stations was in excess of 34·99‰ salinity, the mean bottom sounding, to the nearest 5 metres, between the two stations was taken as the zero current depth.

2. Between two stations the verticals of which intersected the continental, or bank, slope *above* the 35‰ isohaline, in the one case, and the 35‰ isohaline itself in the other, the zero current depth was assumed to be that of the average of (*a*) the bottom sounding of the shallower station, (*b*) the depth of intersection of the 35‰ isohaline with the slope, and (*c*) the depth of the intersection of the 35‰ isohaline with the deeper station vertical. The third datum involves certain conditions on which the accuracy of the assessment depends:—

(i) Intersection of a station vertical with the 35‰ isohaline entails interpolation in most cases. For the purpose intended this interpolation must be as accurate as possible, and to secure this actual observation of salinity should be taken at sufficiently close intervals of depth, not greater than at each 100-metre interval but preferably even less, about the level where the intersection may be expected. Even the former condition has not been met in all cases dealt with in the following, thus allowing more or less considerable scope in some instances for interpolation from curves drawn as above described with due observance of the condition of mutual agreement among the curves of temperature, salinity and density.

(ii) Intersection of the 35‰ isohaline with the continental, or bank, slope likewise depends for its accurate determination on the proximity of the nearest station to the slope, or the proximity of neighbouring stations on the slope. In such regions hydrographic stations should be not more than about 25 to 30 kilometres apart, and in all cases, below about 150 to 200 metres depth according to the conditions, adequate depth checks by the use of unprotected reversing thermometers are practically essential. A certain amount of error in the following hydrodynamical calculations no doubt arises from deficiencies in the above respects.

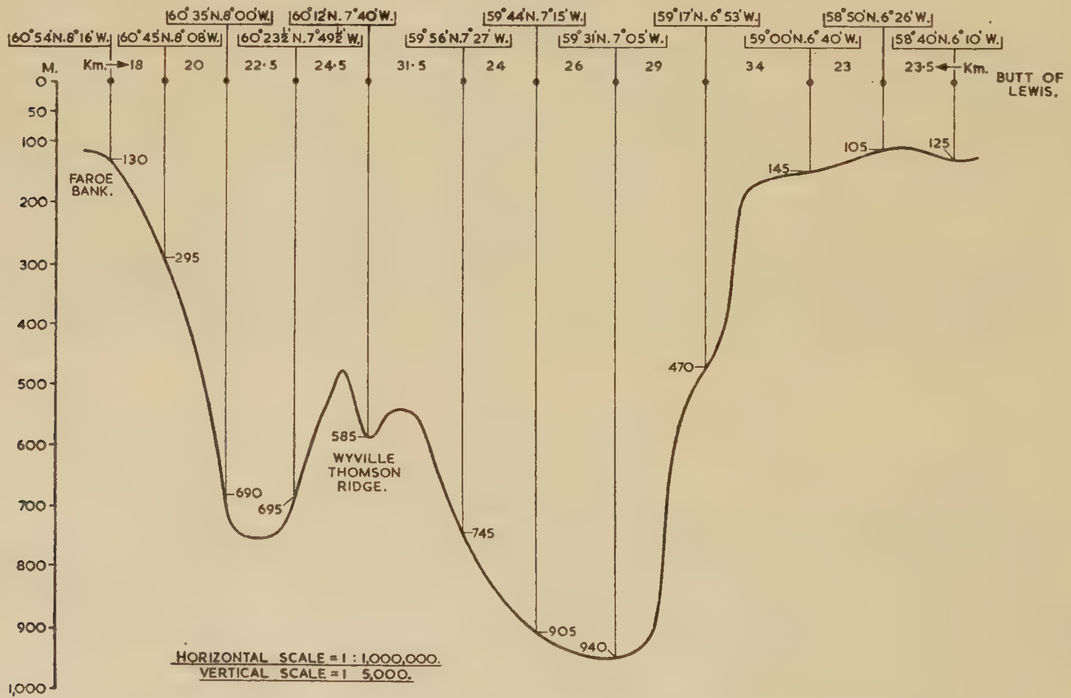
60°35'N. 8°00'W.
60°12'N. 7°40'W.
59°44'N. 7°15'W.
59°17'N. 6°53'W.
58°50'N. 6°26'W.
60°54'N. 8°16'W.
60°45'N. 8°08'W.
60°23½'N. 7°49½'W.
59°56'N. 7°27'W.
59°31'N. 7°05'W.
59°00'N. 6°40'W.
58°40'N. 6°10'W.
M.
Km.
18
20
22·5
24·5
31·5
24
26
29
34
23
23·5
Km.
BUTT OF LEWIS.
0
50
100
200
300
400
500
600
700
800
900
1,000
130
FAROE BANK.
295
690
695
585
WYVILLE THOMSON RIDGE.
745
905
940
470
145
105
125
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.

FIG. 2 The Faroe Bank to Butt of Lewis hydrographic section, showing ideally the relative positions of the station verticals on the fullest section as worked since 1949, and the bottom contour as drawn from the soundings given on British Admiralty Chart No. 423.

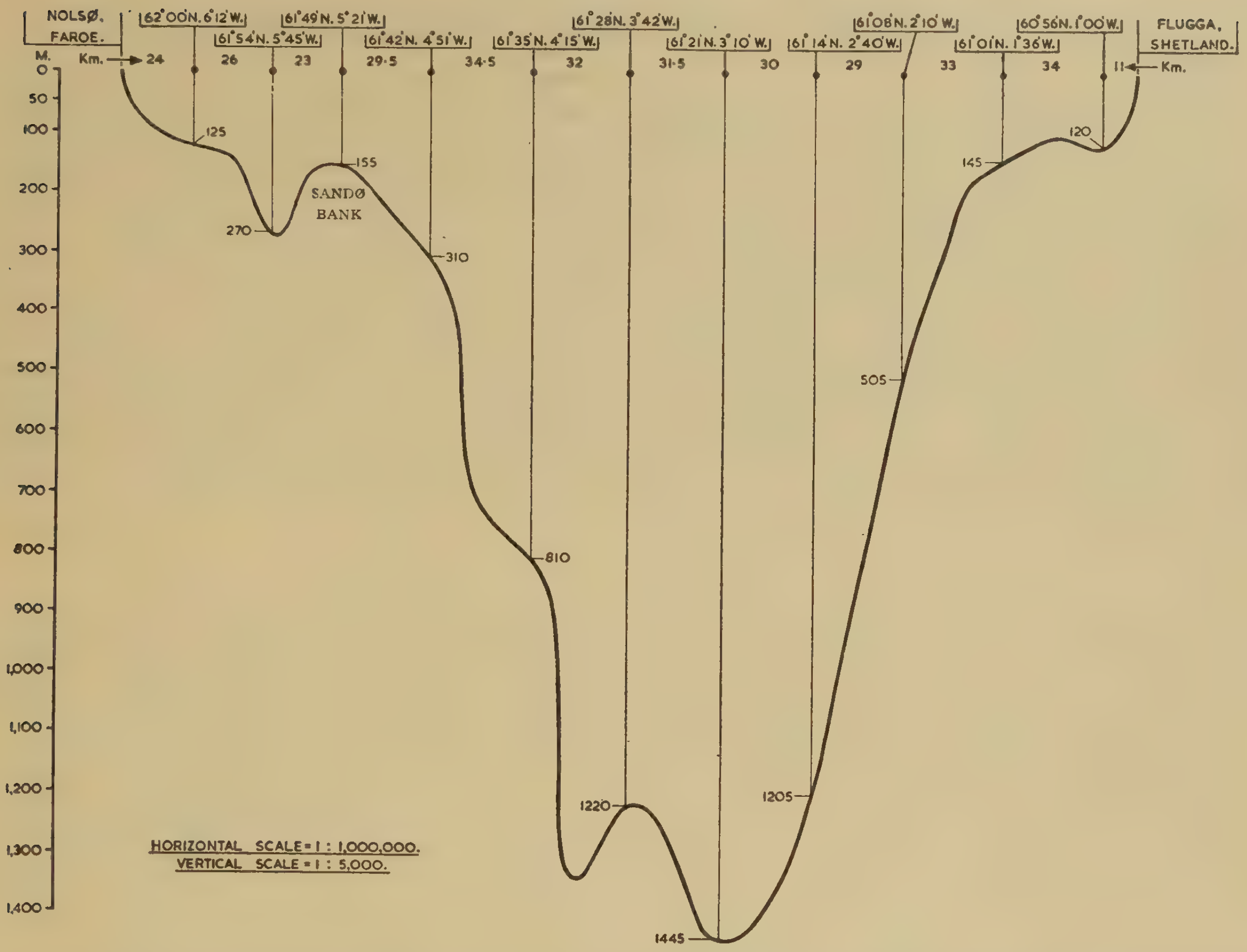

FIG. 3 The Nolsø, Faroe, to Flugga, Shetland, hydrographic section, showing ideally the relative positions of the station verticals on the fullest section as worked since 1949, and the bottom contour as drawn from soundings given on British Admiralty Chart No. 2, and others made by Scottish research ships.

As a corollary to (ii), a certain aspect of the hydrodynamical computations depends more or less closely upon the positions of stations relative to the slopes of banks or continents. For stations situated on such slopes or on the banks or shelves themselves, the specific volume anomaly for successive standard levels below the actual sounding of the station concerned was estimated according to the method introduced by Helland-Hansen (1934).* This method requires the accurate termination of sectional specific volume anomaly curves on the slope, and for this obviously the position of the nearest station to the slope is material. Especially among the earlier data examined in this report, difficulty frequently arose owing to uncertainty in regard to the terminations of curves in consequence of the distance of the nearest deep water station from the steep slope of a bank or shelf. In later years this difficulty has to a great extent been eliminated by including more stations on the section near the regions concerned. Figures 2 and 3 represent common bathymetric traces of the respective sections as taken from British Admiralty Charts. The full number of stations now worked on each section is shown. Comparison of these figures with the figures of sectional temperature and salinity distributions (figures 8-81) clearly indicates the importance of stations situated in intermediate positions between the deepest water adjacent to a shelf or bank and the water on top of the shelf or bank itself.

*Reference may here be made to the method suggested by Groen (1948) which appeared only after the mass of the calculations for this investigation had been practically completed and which appears to have somewhat more realistic physical background than either Helland-Hansen's method or that later proposed by Sverdrup, Johnson and Fleming (1942, p. 451).

THE VOLUME TRANSPORT OF OCEANIC WATER, 1927-1939*

The essential observational and computational elements upon which the following dynamic investigation is based appear in Appendix II. The results of these computations are incorporated in Table 1 with some additional information adduced by way of confirmation, or support, of the main results achieved.

Presumably, for instance, if it exists in fact, and on the hypothesis that the Atlantic Current through the Faroe-Shetland Channel is of the nature of a stream current, hydrodynamical agreement between the two sections in respect of volume transports of oceanic water might be expected to extend at least approximately to the maximum surface velocities on the two sections, thus affording at least a measure of confirmation of the volume transport agreement. Calculated on the basis of the same zero levels as for the volume transport computations, the maximum surface velocity on each section is also entered in Table 1. Further in support of these dynamically computed velocities, there are also tabulated the *minimum* average surface velocities derived from appropriate surface drift-bottle records where such exist, involving passage through, or from, the Faroe-Shetland Channel, usually to the Norwegian coast, during or about the same period as the sectional observations were taken. The details of these records are given in the text following.

1927

The close agreement recorded, and that at the lowest magnitude of all similar figures listed in Table 1, between the volume transports of oceanic water through the two sections of August, 1927 (Figures 8 and 9), is perhaps the more remarkable in the light of some at least of the following circumstances, the weight of the accumulated evidence of Table 1 being against the probability of the agreement being fortuitous.

On this first occasion when the section over the Wyville Thomson Ridge was worked approximately in conjunction with a cross-Channel section situated farther north, operational details in the collection of the original observation material were less exacting than those now practised. To begin with, each section numbered only seven stations, spaced at intervals ranging from 29 to nearly 63 kilometres. To some extent the stations were strategically selected in relation to the bottom contour and the assumed path of the Atlantic Current, but, on the other hand, the risk of inaccurate hydrodynamical computation from the more widely spaced stations is probably considerable, although it would not appear to have been so in the present instances. More recent sections, when complete, include twelve stations between the Butt of Lewis and Faroe Bank (Figure 2), and eleven stations between Shetland and Faroe (Figure 3), the spacing between stations being more uniform at about 25 to 30 kilometres.

Another factor which can scarcely be considered as other than disadvantageous to the present case is the interval of eleven days between the two sections. Moreover, in view of the direction of transport of the water-mass concerned in relation to the two sections and the fact that the more northerly section was completed in advance of the other, this interval was then only a minimal one. Accepting the reality of the dynamical agreement, therefore, conditions in regard to the intensity of the Atlantic Current throughout the entire period embraced by the two sections, namely from the 7th to the 20th of August 1927, would appear to have remained practically unchanged. It is to be observed in passing that the sections were overtaken, within two or three hours, in a complete multiple of, in the one case the semi-diurnal, and in the other the diurnal, tidal period.

In 1927 unprotected reversing thermometers were not in general use as a means for the correction of metre-wheel depth registrations. Accordingly no such corrections were applied on the above operations. The research vessel *Explorer*, however, from which the work was carried out, possessed the fortunate characteristic of being easily manœuvrable in relation to the hydrographic sounding-wire which thus almost invariably hung more or less vertically, and in August 1927 the wind force (Beaufort scale) on the Wyville Thomson Ridge section did not exceed a maximum of 2, and on the other section scarcely exceeded 3. So that any error thus introduced into the temperature and salinity observations was almost certainly of a very minor nature and, therefore, from the present standpoint, negligible.

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*Sectional diagrams of temperature and salinity distributions, properly belonging to PART TWO of this memoir, but occasionally referred to in the following dynamic study, are to be found in Figures 8-81. Those pertaining to this section are Figures 8-31.

Nor were even protected reversing thermometers employed on the 1927 survey, the whole operation being carried out with the Nansen thermometer in conjunction with the then latest pattern of the Pettersson-Nansen insulating water-bottle.

On the whole, therefore, it would seem that the original observations and the depths at which they are recorded as having been taken are at least reasonably accurate, and that, subject to the limitations of the method employed, the dynamical computations may also be accepted with some confidence.

Although not of immediate relevance to the result obtained in the Faroe-Shetland Channel about mid-August 1927, mention may here be made in passing of Helland-Hansen's result (1934) of 10 Km³/hr. for the volume transport of Atlantic water (salinity >34.99‰) through the Norwegian "Sogne Fjord section" at the end of May in the same year. The Sogne Fjord section, so-called, which has frequently been worked by Norwegian investigators since the beginning of the present century and reported upon by Helland-Hansen in the above-cited and other publications, lies in the southmost part of the Norwegian Sea approximately parallel to the Scottish hydrographic sections between Faroe and Shetland. Comparable results might therefore be expected from *contemporaneous* surveys of these two sections and, as will be seen later, has in fact been achieved for at least one year. The more recent of these investigations, however, in the years 1950 to 1952 when the Wyville Thomson Ridge and Faroe to Shetland sections were several times repeated in course of a single year, indicate that Helland-Hansen's Sogne Fjord result of 10Km³/hr. for the end of May 1927 may not in fact be incompatible with the Scottish result of about 1·5 Km³/hr. for the Faroe-Shetland Channel two and a half months later.

On the stream-current hypothesis already mentioned (p. 16), confirmation of the apparent agreement between the intensities of the Atlantic Current through the two Faroe-Shetland Channel sections of August 1927 would appear to be implicit in the similar agreement between the maximum surface velocities of 6·0 and 5·7 nautical miles per day respectively as given in Table 1, and as hydrodynamically computed on the basis of the same zero current levels as were assumed in the volume transport calculations. It is of interest for further comparison to note the portion of each section on which these maximum velocities evidently obtained. On the Wyville Thomson Ridge section maximum velocity occurred within the northern half of the section, between longitudes 7°27′W and 7°40′W, directly over the Ridge itself, while on the more northerly section the greatest surface current velocity lay between longitudes 3°36′W and 4°02′W in the southern half, over the edge of the continental shelf.

In support of these figures in turn there is cited in the ultimate column of Table 1 a figure of 5·5 miles per day which derives from a surface drift-bottle record. The bottle concerned was released on 26 May 1927, at the position, latitude 57°34′N, longitude 9°06′W, near the island of St. Kilda, and after certainly passing through the Faroe-Shetland Channel was recovered on the Norwegian coast in latitude 67°09′N, longitude 13°59′E, on 28 October 1927. The minimum course overtaken by this drifter was therefore about 857 miles which, in the 155 days between the dates of liberation and recovery, was thus covered at an average speed of 5·5 nautical miles per day. By the convention adopted in the cartographical analyses of all such Scottish drift-bottle records, this average speed may be looked upon as having been centred on the mid-date of the interval, namely 11-12 August 1927, intermediate between the inclusive dates of the two hydrographic sections of that month.

As mentioned above, the volume transport figures for 1927 are the lowest of all such values recorded in Table 1. It may not be without significance in this connection that the extraordinary phenomenon of an iceberg within the limits of the North Sea was reported on 23 October in that year (see "The Marine Observer", Vol. V, 1928, p. 75). Skipper Duffin of the trawler *Grecian Empire*, who made the report, gave the dimensions of the berg which he saw in broad daylight as about 100 feet in length with about 6 feet above water, and its position as approximately 30 miles ESE of the Outer Skerries, Shetland Islands, in about latitude 60°23′N, longitude 0°33′W.

1929

Oceanic water volume transport agreement between the two sections of May 1929 (Figures 10, 11), again with an interval of eleven days between them, is once more remarkably close, but at a figure radically different from that of August 1927. The agreement is the more remarkable in view of the

TABLE I

VOLUME TRANSPORT and Maximum Surface Velocity of the ATLANTIC CURRENT in the FAROE-SHETLAND CHANNEL, through the hydrographic sections:—
(a) FAROE BANK to BUTT OF LEWIS; (b) FAROE ISLANDS to SHETLAND (or FAIR ISLE)

Year	Inclusive Dates of Sections Day/Month		No. of Hours on Sections		No. of Stations		Interval in Days between mid-dates of Sections	VOLUME TRANSPORT Km³/hr.		Maximum Surface Velocity in nautical miles per day		Minimum Average Surface Velocity in nautical miles per day by Faroe-Shetland Channel drift-bottles, with mid-dates of drift-periods
	(a)	(b)	(a)	(b)	(a)	(b)		(a)	(b)	(a)	(b)	
1927	18/8-20/8	7/8- 9/8	45	38	7	7	11	1·4	1·7	6·0	5·7	5·5 (11-12/8)
1929	28/5-29/5	17/5-18/5	45	31	9	9	11	14·0	13·2	12·2	17·5	
,,	—	22/6-24/6	—	39	—	10	—	—	13·3	—	10·2	
1931	27/5-28/5	16/5-18/5	43½	35	9	9	11	2·5	2·2	6·0	8·1	
1933	20/6-22/6	9/6-11/6	40½	36	9	9	10½	3·6	2·9	5·6	4·2	5·4 (2-3/7), 4·9 (6/7)
1934	—	21/4-22/4	—	29¾	—	10	—	—	4·8	—	6·3	
,,	—	31/5- 1/6	—	30	—	10	—	—	4·4	—	7·5	
,,	—	11/7-13/7	—	36	—	8	—	—	3·1	—	5·3	
1935	27/5, 5/6-6/6	15/6, 17/6-19/6	32½[1]	36½[2]	8	11	*ca*12½	5·5	5·7	3·2	7·0	7·0(16-17/6),7·0(17-18/6)
1936	28/5, 2/6-4/6	5/6, 13/6-15/6	36[3]	*ca*39[4]	9	11	*ca*11	3·9	3·9	1·9	7·3	7·6 (16-17/6)
1937	28/5-30/5, 3/6	21/5-23/5	44[5]	38½	8	10	7¼	8·8	8·8	21·0	18·8	21·0 (1/6)
1938	—	3/5- 4/5	—	28	—	8	—	—	9·3	—	7·0	
,,	26/6-27/6, 2/7-3/7	5/7- 6/7	33½[6]	38	9	11	—	12·8	9·6	6·9	5·8	6·6 (10/7)
1939	26/6-27/6	17/6-18/6	34	31	9	11	9	8·3	8·3	13·1	13·0	
,,	—	13/7-14/7	—	23¼	—	8	—	—	10·4	—	11·1	
1946	—	26/8-27/8	—	33	—	9	—	—	5·0	—	6·0	5·9 (1-2/8)
1947	18/6-19/6	10/6-12/6	33½	39½	9	11	8	19·9	19·3	11·1	13·8	12·2 (27-28/6)
,,	—	19/7-20/7	—	25¾	—	11	—	—	15·8	—	7·5	
1948	3/5- 4/5	8/5-10/5	29½	39	9	11	5½	5·9	6·2	6·9	10·7	
,,	12/6-13/6	—	21	—	8	—	—	8·9	—	13·4	—	
,,	—	12/8-14/8	—	38¼	—	11	—	—	4·7	—	8·3	
1949	—	8/3-10/3	—	34	—	11	—	—	7·3	—	8·4	8·6 (13-14/3)
,,	29/4-30/4, 8/5	—	32+3½	—	12	—	—	5·2	—	3·8	—	3·4 (12-13/5)
,,	30/7-31/7[7]		36		8		—	11·5		9·3		
,,	3/9- 4/9	12/9-13/9	32	31½	12	11	9½	12·4	10·0	9·1	8·3	8·9 (23/8), 9·9 (5/10)
,,	11/11-12/11	22/11-24/11	33	42	12	10	*ca*11¼	13·9	14·3	15·6	8·3	
1950	7/3- 8/3	—	30	—	12	—	—	15·7	—	13·3	—	9·0 (26/2)
,,	12/5-13/5	21/5-23/5	29	36	12	11	10	2·5	3·4	3·8	3·1	
,,	—	31/5- 1/6	—	35	—	11	—	—	4·2	—	11·3	
,,	16/6-17/6	27/6-29/6	29	31	12	11	11	6·1	5·5	15·3	9·4	
,,	19/7-21/7	2/8- 4/8	33	35	12	11	14	4·9	3·8	13·3	10·0	10·0 (29/7)
,,	—	17/8-19/8	—	31½	—	11	—	—	3·7	—	7·3	6·0 (22/8)
,,	3/11-5/11	—	30½	—	12	—	—	12·3	—	12·6	—	
1951	18/5-20/5	1/6- 2/6	29¼	27½	12	11	13	3·5	13·2	10·2	8·7	
,,	16/6-17/6	7/6- 9/6, 16/6	33½	42[8]	12	10	*ca* 9	14·7	13·5	12·9	16·2	
,,	13/7-15/7	23/7-25/7	36	38	12	11	10	2·4	2·0	16·5?	6·3	5·1 (28/7)
,,	15/8-16/8	—	24	—	10	—	—	2·7	—	2·4	—	3·4 (10/8)
,,	19/9-20/9	—	30	—	12	—	—	10·0	—	7·3	—	6·3 (11/9)
,,	—	28/10-30/10	—	36	—	11	—	—	10·8	—	13·0	13·0 (1-2/11)
,,	—	10/12/13/12	—	21[9]	—	10	—	—	23·4	—	13·2	14·7 (19/12)
1952	—	18/2-20/2	—	30	—	11	—	—	11·9	—	14·9	
,,	10-11/3, 13-14/3	—	28½	—	12	—	—	14·5	—	8·9	—	9·3 (13/4)
,,	8/5-11/5	18/5-19/5	*ca*24½	30	12	11	8	3·4	3·1	2·9	4·6	3·4 (25/5)
,,	—	31/5- 2/6	—	*ca*30	—	11	—	—	8·1	—	8·2	7·9 (14/6)
,,	—	21/6-22/6	—	34¾	—	11	—	—	6·8	—	8·9	8·9 (18/6)
,,	5/7- 6/7	17/7-18/7	28	28½	12	11	12	6·8	9·8	4·2	6·3	6·4 (5/7), 6·5 (17/7)
,,	4/11, 8/11-9/11	17/11-18/11	—	32	10	11	*ca*10	11·2	10·3	5·2	8·0	6·7 (23-24/12)

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[1] The seven stations on 5-6 June
[2] The 10 stations 17-19 June
[3] Except the terminal station at the Butt of Lewis
[4] Except the terminal station at Faroe
[5] Except the terminal station at the Butt of Lewis
[6] Broken by 5 days' interval in mid-section
[7] Section intermediate in position between (a) and (b)
[8] Except the terminal station at Faroe
[9] Except the terminal station at Faroe

apparent abnormality of certain of the original data, especially on the northern section—which on this occasion lay between the islands of Syderø, Faroe, and Papa Stour, Shetland—and, in particular, at the position, latitude 60°47′N, longitude 3°23′W, on the continental slope west of Shetland.

The association at this station at a depth of only 300 metres of such a low temperature as +0·70°C with a salinity of 35·26‰ is, *prima facie*, by the weight of previous experience at least open to question. Not only do these associated observations entail the very high σ_t value of 28·30, but this in turn represents a strong density inversion in relation to deeper levels, with a correspondingly marked degree of vertical instability in the water column. The salinity apparently remaining constant from 200 to 300 metres depth, it would appear to be the temperature observation of 0·70°C at 300 metres which may be erroneous. Observations were not taken at 400 metres and those at 500 metres, namely, −0·91°C and 34·88‰ respectively, represent very considerable declinations in both temperature and salinity from 200 to 500 metres. At both these levels, however, the associated temperature and salinity observations are reasonable and acceptable.

Accordingly, in the first dynamical assays of the data for the entire section on the principles underlying all such computations in this investigation, temperature and salinity data for 300 and 400 metres were interpolated from the depth-temperature and depth-salinity curves between the 200 and 500 metres observations. Such a wide interval of depth and such divergent observations allow of considerable latitude in the tracing of the respective curves between these levels. The results, however, in volume transport, from all calculations with interpolated data at 300 and 400 metres, were quite incompatible with the corresponding result from the contemporary southern section. In short, the agreement signified by the figures of 14·0 and 13·2 Km³/hr. respectively in Table 1 was only derived by use of, and interpolation where necessary (i.e. at 400 metres) from, the original observations as recorded.

Acceptance of the low temperature/high salinity combination above-noted at 300 metres on the northern section of May 1929 receives support from an even more anomalous combination at 600 metres depth on the same section over against the eastern slope of the Faroe Islands shelf, and from other similar instances occurring in this investigation. These, together with the foregoing, are discussed in the second part of this report (pp. 60-62, 64, 65, 71, 73, 77, 83, 108).

Incidentally, however, discovery of the evident reality and significance of the deeper anomalous temperature-salinity combination on the above May 1929 section followed considerably after the hydrodynamical computations had been completed. The salinity involved, and because of its thermal association at first discarded, evidently denoted (see Part II, p. 60) the nucleus of a small body of oceanic water in process of becoming—indeed almost become—detached from the parent oceanic water-mass. This small oceanic protuberance from the main mass was not included in the hydrodynamical assay of the section. It occurs within a water column, between a pair of stations, the resultant volume transport of which was northward or north-eastward as can be seen from Appendix II. Hence the oceanic volume transport agreement between this section and its southern contemporary was probably even closer than is indicated by the figures of Table 1.

Because of its unique character among all similar diagrams constructed for this examination the specific volume anomaly diagram for the northern section of May 1929 is reproduced as Figure 10a. The suggestion is self-evident in this diagram of something in the nature of an elongated, slightly skew, vertical vortex, with a horizontal axis approximately normal to the plane of the section at a depth of about 320 metres on the vertical through latitude 60°47′N, longitude 3°23′W. This small peculiar circulation had evidently disappeared one month later, that is, in the latter half of June 1929, when almost exactly the same oceanic volume transport was computed through the same section (Figure 12).

Still another close relationship tending to confirm the volume transport assessments for the three Scottish sections of 1929 is that which obtains between these assessments and Helland-Hansen's figure of 11·92 Km³/hr. derived from different premises in respect of the Sogne Fjord section of 24-27 May 1929 (Helland-Hansen, 1934).

In all three cases the computed maximum surface velocities on the Scottish sections refer to practically the same parts of the respective sections as do the corresponding velocities of 1927. Those for the southern section in May and the northern section in June are in fairly close agreement, but differ considerably from that of the northern section of May which would appear to be excessive, perhaps in some way connected with the above-indicated complexity in circulation off the continental slope.

Surface drift-bottle records in 1929 include none which covers the period of the hydrographic sections and in respect of which an approximately direct passage between positions of release and recovery can be postulated, thus to furnish an estimate from this independent source of surface velocity at the time in the Faroe-Shetland Channel.

On the question of the influence of internal waves on the above computations, as postulated by Defant (1950), it is to be noted that two of the three sections under review occupied within about three hours a multiple of either the semi-diurnal, or the diurnal tidal periods of approximately 12 and 24 hours respectively. The mid-May Faroe-Shetland section on the other hand occupied only 31 hours, but the circumstance would not seem to have had an appreciable effect upon the result in relation to its agreement with that of the corresponding Faroe Bank-Butt of Lewis section overtaken eleven days later.

In conclusion, and as bearing upon the accuracy of the original observation material to which, within the scope of the data required for the above hydrodynamical investigation and apart from instrumental error correction and interpolation at standard levels, no alteration has for any reason been made, the following may be said.

The majority, but not all temperature observations, as in 1927, were made by the Nansen thermometer affixed in the lid of the standard Pettersson-Nansen insulating water-bottle. At the deeper stations, however, single reversing thermometers with reversing water-bottles were employed in series at the deepest levels, generally below 200 metres. Still no unprotected reversing thermometers were used as depth checks, but once again, with winds never above Beaufort scale 3, except at the shallow terminal station off the Butt of Lewis where a wind of force 4 was registered and at the similarly shallow Faroe terminal station of the June section which was worked in wind of force 5, weather conditions during the three Faroe-Shetland traverses of 1929 justify the confidence which has been gained by experience in the accuracy of the metre-wheel registrations under such conditions on the research vessel *Explorer*.

All salinity determinations as already mentioned were carried out by the British Government Chemist and are accepted with complete confidence in all cases where factors which might give rise to inaccurate results, e.g., loose stoppers, or only partly filled bottles, are not cited by that authority.

1931

Once again the volume transport agreement between the two sections of May 1931 depends upon the acceptance as factual and real of certain of the original data—this time on both sections—which would formerly have been discarded as being almost certainly erroneous. These are the unusually high and more or less isolated salinity records of 35·64‰ and 35·57‰ on the southern section (Figure 14) and 35·46‰ on the northern section (Figure 13), all in the uppermost water layer to a depth of about 100 metres.

It is worthwhile to digress in further comment on these high salinity records, for a not unimportant secondary outcome of this entire investigation into the quantitative assessment of the Atlantic Current in the Faroe-Shetland Channel is the case which is implicit therein for their acceptance; in the absence, that is, of definitely qualifying circumstances arising from deficiencies in one respect or another in the original collection of the water samples, their storage, or in regard to the determination of the results, and notwithstanding the greater or less degree of vertical instability due to density inversion which they usually involve. It seems more than probable that by the suppression of such records hitherto, much information has been lost, of a kind, for instance, as that deriving from a study of high salinity records in the northern North Sea in the four successive years of which that under present examination was the first (Tait, 1935). By more or less systematic hydrographic survey of this region, particularly in spring and summer months of the four years 1931 to 1934 inclusive, and superimposed on the long recognised seasonal variation in salinity, a progressive change in the character of the oceanic water incursion by way of the Faroe-Shetland Channel was revealed not only by a proportionately and progressively increasing *number* of extraordinarily high salinity values occurring in these four years, but also by their annually increasing *magnitudes*, to a maximum of at least 35·85‰ in the month of June 1934. In point of fact there occurred two identical records of still greater magnitude, namely 36·02‰, the first in the month of October 1933 in close proximity to Fair Isle and the second in the beginning of April 1934 at a position some twenty miles north of this, namely, between the island of Foula and the mainland of Shetland. The only apparent circumstance, apart from vertical density inversion where this is involved, occasioning doubt of these highest records, is the complete absence of anything comparable from the same or near neighbouring regions in the annual volumes of the *Bulletin Hydrographique* published by the International Council for the Exploration of the Sea since the beginning of the century. The essential point to note now, however, as a result of the present investigation, is that by reason of their apparent hydrodynamical significance and consequently of their reality, such unusually high values of salinity should on no account be discarded save for definite and adequate reason.

In passing, it may be observed that the maximum salinity record for the Faroe-Shetland Channel in May 1931, namely 35·64‰, is practically identical with the maximum value of 35·66‰ which was recorded some six weeks later, i.e., in the beginning of July, in the northern North Sea (Tait, 1935, Figure 1a).

The volume transport agreement in the latter half of May 1931, recorded at about 2 to 2·5 Km^3/hr. (Table 1), signifies a very low intensity of the Atlantic Current in that particular season. The dynamically computed maximum surface velocities for the pair of sections are scarcely in such close, but nevertheless in fair, agreement.

Again, as in 1929, among the surface drift-bottle records for the year 1931, none which had traversed the Faroe-Shetland Channel region *en route* to Norway, embracing the latter half of the month of May in its drifting, yields a minimum average drift-velocity comparable with those found by computation. There can be little question, however, that complications in the courses of the drifters concerned retarded their progress to Norway, thus implying, on the hypothesis of continuously progressive routes to their stranding-places, deceptively low average rates of drift. Certain north-western North Sea records, also subject to complications *en route*, show however that the mean speed of the surface drift in this region could not have been less than 5 miles per day in the first half of May 1931. It can safely be inferred therefore that the rate of surface drift in the Faroe-Shetland Channel at the same time was not less than this, but almost certainly somewhat greater.

The two Faroe-Shetland Channel sections of May 1931 correspond almost exactly in calendar time with the same two sections of May 1929. The great difference in the intensities of the Atlantic Current through the Channel in these corresponding periods of different years is therefore to some extent indicative of the great scope of the annual fluctuation in this important hydrographical feature of north-west European seas.

With regard to operational circumstances in the performance of the May 1931 sections it is still to be recorded that, while paired reversing thermometers were used in depths of 200 metres and more, the Nansen thermometer in insulating water-bottle doing service in the upper water levels, no depth checks in the deeper levels by unprotected reversing thermometers were carried out. Wind strengths between Faroe Bank and the Butt of Lewis were practically constant at Beaufort force 3 in the northern part of the section, but, on the southern part, on the last four stations, winds increased from force 4 to force 6, so that some error in the depths of the observations may pertain to the two deeper stations in this group. In the deepest part of the northern, Faroe to Shetland, section, winds of force 4 were also registered. Here again therefore there may be some, probably small, error involved in the observational depths as listed.

The approximations to multiples of the semi-diurnal tidal period and in the case of the southern section also the diurnal period, which are noted in Table 1 in respect of the two 1931 sections, would seem to have been sufficient to neutralise any displacement effects which internal waves may be deemed to have had upon the dynamic results, in so far as the close agreement of the volume transport figures is indicative of the comparative ineffectiveness, in the aggregate, of any such displacements.

1933

In greater numbers and magnitudes, high and extraordinarily high salinity values are again a significant factor in the volume transport computations for the two Faroe-Shetland Channel sections of the month of June 1933 (Figures 15 and 16) and, of course, in the agreement recorded between these values which are of an order only slightly above that of May 1931.

The highest salinity observations, with greater or less vertical instability entailed, occurred at five of the nine stations of the Faroe Bank-Butt of Lewis section. The highest figure, 35·94‰, was registered at a depth of 20 metres off the continental edge north-west of the Butt of Lewis (see Figure 16). At the same station at 80 metres depth, 35·52‰, and at 265 metres, 35·60‰, were registered. Bottom salinity at 113 metres nearer to the Butt of Lewis on the continental shelf was recorded as 35·58‰. At the deeper stations on the south side of the Wyville Thomson Ridge, 35·57‰ at 10 metres, 35·51‰ at 40 metres, and 35·61‰ at 700 metres were registered at one station, while at the next adjacent position on the section values of 35·62‰ and 35·73‰ refer to the levels of 30 metres and 840 metres respectively. Finally, over against the Faroe Bank, a surface value of 35·51‰ lay atop of 35·42‰ at 10 metres depth. Some of these high records at the deepest levels do not enter into the dynamical computations of this investigation, but are discussed later in this report in the consideration of temperature and salinity distributions.

On the northern section between Faroe and Shetland (Figure 15), four more or less isolated salinity values, in the vertical sense, of 35·44‰, 35·42‰, 35·47‰ and 35·48‰ respectively, occurred at the 30-metre level at four adjacent stations from about mid-section south-eastward, but these, because of the temperatures with which they are associated, do not involve vertical instability in the water column due to density inversion. A fifth high value of 35·38‰ which does entail a slight density inversion occurred at 80 metres depth on the terminal station of the section off west Shetland. Still another relatively high record in respect of its depth and geographical location is discussed in connection with the temperature and salinity distributions on the two sections (p. 65).

As already remarked, by these computations the intensity of the Atlantic Current through the Faroe-Shetland Channel in June 1933 was only a very little greater than that of May 1931. Compared with the corresponding period of 1929, the intensity of June 1933 was only about one quarter of the earlier one.

Maximum surface velocities of the Atlantic Current in June 1933 appear also to have been relatively low, even lower than those of 1927, the year of the lowest intensity of all recorded in these investigations.

Although centred on slightly later dates by the convention adopted in their interpretation, the two shortest-period surface drift-bottle records which embrace the Faroe-Shetland Channel region during June 1933, yield minimum estimates of surface drift velocity through the Channel in the first week of July 1933, i.e. within a fortnight of the later of the two hydrographic sections, which bear closely upon the dynamically computed maximum surface velocities on these sections. One of the drifters—that furnishing the estimate of 5·4 miles per day on 2-3 July—was released on 16 April 1933 midway between the Butt of Lewis and Cape Wrath and fetched up in the higher latitudes of the Norwegian coast (latitude 60°N) on 17 September 1933. The other drifter, estimated to have travelled at a mean rate of 4·9 miles per day, was liberated in the vicinity of St. Kilda off the Outer Hebrides and reached nearly to latitude 65°N on the coast of Norway in 150 days. These figures afford a substantial measure of corroboration of the dynamic surface velocities of 5·6 and 4·2 miles per day as entered in Table 1.

As in 1931, paired reversing thermometers, but no unprotected reversing thermometers, were employed for temperature registration at the deeper levels from generally 300 or 400 metres downwards on both sections. Wind strengths, however, were below force 3 at all but one station on the northern section, so that no appreciable error in depth registration should be included in the observational material for that section. Forces 4 and 5 winds on the northern half of the southern section on the other hand may have introduced such error at the deeper stations between Faroe Bank and the southern slope of the Wyville Thomson Ridge. This however, may be taken to have been relatively small and almost certainly of negligible account so far as these investigations are concerned.

The duration of the northern section at 36 hours was thus closely related to the semi-diurnal tidal period and should therefore entail little if any appreciable error from internal wave interference along the section as a whole. The southern section on the other hand, occupying 40½ hours, unless the interposition of the Wyville Thomson Ridge in mid-section may tend to modify internal wave action, might be supposed to include some error from this cause. If such is the case, however, the agreement of the volume transport figures is sufficiently close to permit the inference that any such error must be comparatively small.

1934

The Danish research vessel *Dana* made three traverses in 1934 between Faroe and Shetland (Figures 17, 18, 19), approximately along the line of the northern section of the pair usually worked by the Scottish research vessel *Explorer*. The sections were carried out with intervals of approximately six weeks between them, the first at the beginning of the third week of April, the second on the last day of May and the first day of June, and the third in the second week of July. The two first sections included ten stations, but the third only eight.

Operational practice on *Dana* was similar to that employed to this date on the Scottish research ship, water samples to depths of 100-150 metres being taken by means of the Pettersson-Nansen type insulating water-bottle with its accompanying Nansen thermometer for temperature registration. In greater depths reversing water-bottles with paired reversing thermometers were used. No correction for wire angle was made, but it is noted* that this "never exceeded 10° at the surface."

A feature of the observations on all three sections is the complete absence of high salinity records such as characterised the Scottish sections of 1931 and 1933 and which occurred also in the north-western North Sea in considerable numbers in 1934 from the end of March until the end of July (Tait, 1935).

Lacking in each case the corroboration of a second approximately simultaneous section in the region of the threshold to the Channel, the computational results for the three Danish sections must therefore be regarded as on the whole less reliable than those from the pairs of sections hitherto considered. None the less and notwithstanding that, as can be seen from Table 1, only one of the three sections occupied approximately a complete multiple of the semi-diurnal tidal period, the volume transport figures (4·8, 4·4, 3·1 Km^3/hr.) are fairly consistent, as also are the related maximum surface velocity estimates (6·3, 7·5, 5·3 m/d). The latter do not in this instance receive support directly from minimal surface drift-bottle velocities, there being no drift-bottle record which suitably covers the region and period involved. Certain returns, however, indicate that on more or less involved courses to be determined cartographically in conjunction with many other records, the average velocities entailed were of approximately the same order at least as those computed dynamically and entered in Table 1.

1935

Neither of the two Faroe-Shetland Channel sections of June 1935 (Figures 20, 21) was completed without interruption, but in each case it was only a terminal station which was separated in time by more than one day—in the case of the southern section by over one week—from the remainder of the section.

In the collection of the data the procedure already described was again carried out, namely, temperature registration in the upper waters by the Nansen thermometer in conjunction with the Pettersson-Nansen insulating water-bottle for water samples and, below 200 or 300 metres, water samples by reversing water-bottles each fitted with paired reversing thermometers. Unprotected reversing thermometers were still not used.

In 1935 the northern section was situated still farther north than before, nearer to the bathymetric entrance to the Faroe-Shetland Channel proper from the Norwegian Sea, and comprised eleven hydrographic stations. The southern section was again situated between the Faroe Bank and the Butt of Lewis, but an important station in mid-section was omitted. This, however, was not the only feature of the southern section of June 1935 by which it compares unfavourably with other geographically more accurate sections between the same terminal stations. In a later part of this report remark is made in reference to the same section of June 1933 (Figure 16), as to "missing" the summit of the Wyville Thomson Ridge on that particular traverse. The case was even worse in June 1935, as can be seen from Figure 20, where no evidence of the Ridge appears in the bottom contour of the section. This was begun from the southern end in gale conditions on 27 May, interrupted for nine days and continued in winds from the north-east quadrant of Beaufort forces 3 to 5. These circumstances would appear to have caused a deviation to the southward in the ship's course such that the cold relatively fresher water of the deeper levels on the north side of the Wyville Thomson Ridge was not sounded at all. The recorded sounding of less than 200 metres at the penultimate station on longitude 8°W confirms this, for the true position of this station is in fact over the deep water north of the Wyville Thomson Ridge and adjacent to the steep south-eastern slope of Faroe Bank.

Weather conditions on the northern section on the other hand (Figure 21), especially across the central part of the Atlantic Current off the continental shelf, were more favourable for accurate operations, wind force scarcely rising above 3 until towards mid-section and again near Faroe.

Notwithstanding the above circumstances which might reasonably be expected to have adverse effects upon the accuracy of the original observations and so on subsequent calculations based on them, agree-

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*In *Bull. hydrogr., Copenh.* (1934), 1935, p. v.

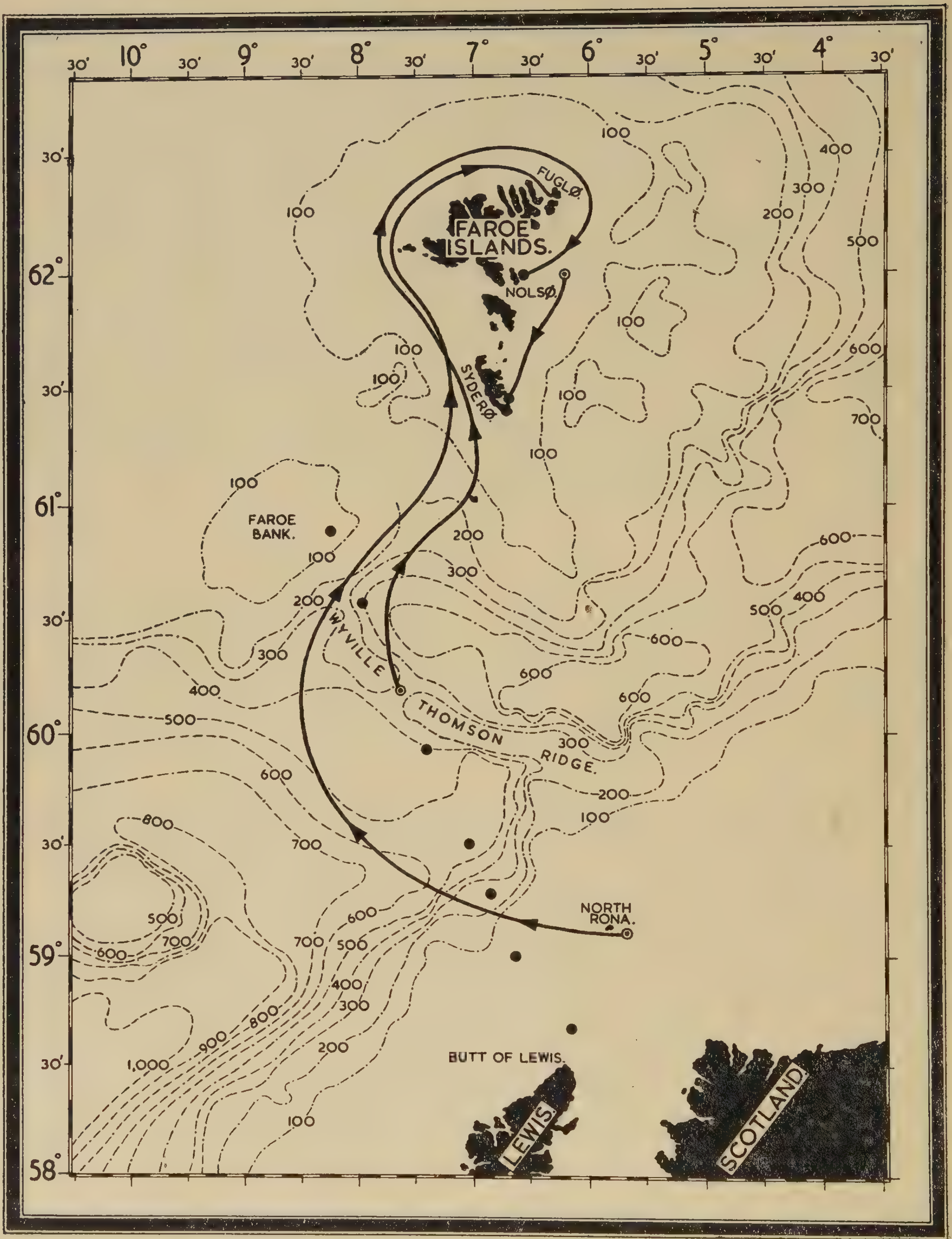
FAROE ISLANDS.
FUGLØ.
NOLSØ.
SYDERØ.
FAROE BANK.
WYVILLE THOMSON RIDGE.
NORTH RONA.
BUTT OF LEWIS.
LEWIS
SCOTLAND
10°
9°
8°
7°
6°
5°
4°
30'
62°
61°
60°
59°
58°
100
200
300
400
500
600
700
800
900
1,000

Fig. 4 Significant surface drift-bottle records in the Faroe-Shetland Channel in mid-summer, 1935.

ment between the volume transport figures in Table 1 is almost perfect at 5·5 and 5·7 Km³/hr. respectively. Compared with the corresponding values for June 1933 these show an increase of the order of 70 per cent in the intensity of the Atlantic Current as between the months of June 1933 and 1935. In consideration of the quantities involved this is an enormous difference between corresponding seasons in two years, in what must be regarded as a major phenomenon in these and further waters. Differences of a much greater order, however, are implicit in the volume transport figures for June 1929 in relation respectively to those of June 1933 and June 1935.

Turning to the 1935 maximum surface velocities dynamically computed for the two sections, these obviously do not in this instance agree. The shortest-period drift-bottle returns from among appropriate records, that is, with mid-dates in or near the periods covered by the hydrographic sections, clearly support the higher of the two dynamic velocities, namely, 7·0 miles per day. Two in particular of these drift-bottle records, one of which has already been noted for its peculiarity in an account of the extraordinary hydrographic conditions of the Faroe-Shetland Channel and neighbouring regions in 1935 (Tait, 1936), are of special interest and of some moment in the present connection as indicative of the reason for the difference between the maximum dynamic velocities of the two sections.

Set adrift on 26 May 1935 near the island of North Rona which lies about 40 miles north-east of the Butt of Lewis and 25 miles within the 100-fathom line defining the edge of the continental shelf, a drift-bottle was most surprisingly recovered on the island of Fuglø, Faroe, 43 days later, having apparently passed rectangularly across the Atlantic Current if this is assumed to have been heading as usual north-eastward through the Faroe-Shetland Channel. From its recovery position it can be taken as practically certain that this bottle arrived there from the north and west of the Faroe Islands. Current on the east side of Faroe is almost invariably southerly, and in support of this for about the actual period concerned in 1935 may be quoted the drift-bottle record from the position, latitude 62°00′N, longitude 6°12′W, on 15 June, to Vaag in Syderø, Faroe, a distance of almost exactly 35 miles covered therefore in the five days between the dates of liberation and recovery at a mean daily rate of 7·0 miles.

By the general surface current chart (Tait, 1937, p. 53) evolved from the analysis of numerous surface drift-bottle records, the Fuglø-recovered drifter might be assumed to have reached west side of Faroe immediately from the west side also of Faroe Bank. On the other hand, while from these analyses it has seemed that water movement on the east side of Faroe Bank is as a rule southerly, the dynamic computations of this investigation (see Appendix II), involving no fewer than twenty-nine sections between Faroe Bank and the Butt of Lewis, indicate that it may with almost equal frequency be northerly, as it would appear to have been in the present instance. So that the drifter from the vicinity of North Rona Island to Fuglø may have attained the west side of the Faroe Islands from the *east* side of Faroe Bank.

Now consider the record from its point of origin. The day following its liberation from the vicinity of North Rona Island—in actual fact scarcely more than twelve hours later—work had to be abandoned off the Butt of Lewis on account of gale conditions from the east of south-east and the section was not resumed until more than a week later. It is reasonable therefore to suppose that from its position of departure the drifter in question coursed away approximately west-northwestwards and so attained the region of the Faroe Bank on its east side as illustrated in Figure 4. Such a course as is there indicated measures some 300 miles from start to finish, entailing thus an average drift-speed of 7·0 miles per day conventionally centred on the 16-17 June, that is, within the period of the Faroe-Shetland hydrographic section.

Still another Faroe recovery lends strong support to this interpretation of the foregoing record. From one of the stations (latitude 60°12′N, longitude 7°40′W) of the Faroe Bank-Butt of Lewis section itself, a drifter reached the island of Nolsø in east Faroe in 39 days after its liberation on 6 June. The course presumably followed by this second drifter to Faroe, very similar to that for the first recovery on Fuglø, yields the velocity of 6·0 miles per day over a route of 235 miles and centred on the date, 25-26 June. This result in turn receives further support from still another. In 69 days around the middle date of 26-27 June, a bottle from a position about 20 miles north-west of Orkney travelled to Kristiansund, Norway, in just above latitude 63°07′N at an average speed cartographically estimated at 6·2 miles per day over the shortest most probable route by way of the west and north of Shetland.

Reverting to the second of the Faroe recoveries, and particularly to the initial stage of its course away from its release position, it seems that therein, as indicative of the direction of the surface current relative to that of the section at this particular time, namely, on 6 June 1935, probably lies the explanation of the relatively low maximum surface velocity, hydrodynamically computed, of only 3·2 miles per day northerly at right angles to the section, this velocity, incidentally, pertaining to the interval between the station which was the position of liberation of the drifter and its next neighbour southward along the section. It is at once apparent, as this practical illustration suggests, that local and temporary aberrations in surface conditions brought about by external influence may more or less conspicuously affect purely surface factors such as current velocity and direction without noticeably affecting more comprehensive phenomena, like volume transport, which involve waters to a considerable depth. In point of fact, however, it will be observed from Table 1 that volume transport across the southern section tends in the majority of cases to be slightly greater than through the northern section, so that the value of 5·5 Km^3/hr. for the southern section in June 1935 is perhaps in fact a little low in relation to the figure of 5·7 Km^3/hr. for the northern section, and this on account of the above-mentioned aberration at the surface of the section on its northern half at least. For the time being, the true maximum surface velocity normal to the section was apparently masked by the temporary change in the direction of the surface current brought about by antecedent gale conditions.

It is further germane to the above deductions and argument to emphasise the unique character of the two foregoing Faroe Islands recoveries of drift-bottles set afloat so far to the south of Faroe and, by normal standards and conditions, either within or on the other side of the intervening Atlantic Current. In a very long series of surface drift-bottle records for the Faroe-Shetland Channel region, extending over at least twenty-five years, no similar result has been recorded either before or since the year 1935.

Finally, in passing from this consideration of the 1935 hydrographic sections, it may be remarked that the observational data on this occasion are devoid of any abnormal salinity values which were such an outstanding feature of the material for 1933 and 1931 respectively, and also that, exclusive of the isolated terminal station of each section, these were both overtaken approximately in the period of three consecutive semi-diurnal tidal periods.

1936

Once again, as was the case in the previous year, the same terminal stations were separated in time by several days from the remainder of each of the two sections in 1936 (Figures 22, 23), these remainders being overtaken each in about three successive semi-diurnal tidal periods. On the southern section, apart from the terminal station off the Butt of Lewis, winds thereafter except at one position were less than force 3. On the northern section, however, force 5 winds were encountered on three stations. The same procedure as before, with paired reversing thermometers used only at the deeper levels and the Pettersson-Nansen insulating water-bottle to 200 or 300 metres depth, was followed.

According to Table 1, volume transport agreement between the two sections in respect of Atlantic water was perfect at 3·9 Km^3/hr., but again the dynamically-computed maximum surface velocities are not in agreement, and again the most appropriate surface drift-bottle records, yielding minimum surface drift-velocities of about 7½ to just over 8 miles per day, favour the higher hydrodynamic velocity of 7·3 miles per day.

There are certain other circumstances concerning the maximum dynamic surface velocity of 1·9 miles per day in reference to the southern section which imply that this was probably not the true maximum velocity on the section. The figure of 1·9 miles per day relates not to one but to two intervals between successive pairs of stations, namely, between the second and third and between the third and fourth stations out from Faroe Bank. One of these stations, namely the second (latitude 60°35′N, longitude 8°00′W), is critical as regards the disposition of the isosteres—especially in the deeper levels below about the level of the summit of the Wyville Thomson Ridge—between the Ridge and the steep slope of the Faroe Bank. At this particular station, unfortunately, the deepest hydrographic sounding which could be made on account of insufficient warp available was only 360 metres. Consequently, the diagrammatic representation of the isosteres below this depth in the region involved, with, in effect, only the data for the third station as a guide, is very largely a matter of judgment. Now, the disposition of the isosteres along

Faroe Bank slope affects also the dynamic computation of volume transport between the first and second stations, which transport works out positively southwards on a very approximate disposition of the isosteres. Taking into account also the rapid diminution in specific volume from the level of the Ridge downwards at the third station, and the practical certainty that similar conditions obtained also at the second station, it is clear that with the data at disposal such an adjustment of isosteres between the Wyville Thomson Ridge and the Faroe Bank slope is possible as would yield, by compensation among the three columnar intervals between the Bank and the Ridge, the same total volume transport as has already been calculated, but on the other hand an estimate of maximum surface velocity in the second interval of approximately 7 miles per day. So that this figure, supported as already mentioned by appropriate surface drift-bottle records, may confidently be accepted at least as a near approximation to the actual state at the time of the hydrographic section, namely 3-4 June 1936.

Of the three surface drift-bottle records cited in Table 1, two are of high latitude Norwegian coast recoveries from liberations at two of the stations on the southern section of June 1936, and the third of a drifter liberated off Faroe Bank towards Syderø, Faroe, and recovered on that island 25 days later. The course for this last-mentioned bottle is estimated to have been by way of the west and north of Faroe over about 190 miles, entailing thus an average daily rate of drift of 7·6 miles centred on the 16-17 June.

The intensity of the Atlantic Current then in June 1936 would appear to have been intermediate between those of June 1933 and June 1935, all three being far below the strength of this influence about the same period of 1929.

Similarly high salinity records as were a feature of the sections in 1931 and especially 1933 did not appear in the sections of 1936. As already noted they were absent also from the 1935 sections. This difference is worthy of remark from the following aspect. The occurrence of such values might be taken as indicative of particularly strong oceanic influence. Volume transport figures, however, show that in fact and relatively the reverse was the case. The true significance of these very high salinities within the oceanic water mass is discussed in the subsequent part of this report dealing with the distributions of temperature and salinity on the Faroe-Shetland Channel sections whose dynamic aspects are presently under consideration. As is there demonstrated these extraordinarily high salinity records of 1931 and 1933 were not essentially of oceanic origin, but emanated originally from the Mediterranean Sea.

1937

With such extraordinary temperature-salinity distributions as are depicted in Figures 24 and 25 it would scarcely have been surprising if, on the basis of these hydrodynamical investigations, little if any semblance of agreement between the volume transports of oceanic water across the two sections of 1937 had been realised. The fact, however, of such perfect agreement as the figures of Table 1 signify, (8·8, 8·8 Km³/hr.), supported as these figures are by such close agreement also, at abnormally high values (21·0, 18·8 m/d), between the maximum surface velocities of the two sections, these in turn being supported by at least one surface drift-bottle record, is in itself, lacking more substantial corroboration, strong evidence in favour of the actuality of the assumptions on which the dynamical computations have been based. As is explained in Appendix I, more direct experimental evidence for the truth of these assumptions has in fact become available.

The sections also were accomplished in nearly integral multiples of the tidal periods. As if to render the above findings the more remarkable the two sections of 1937 were undertaken under probably the least favourable conditions of any yet recorded for these traverses. Indeed the only factor which was more favourable in comparison with previous years was that in 1937 only one week separated the two trans-Channel crossings. But each section, as will be observed from Table 1, was short of one station in 1937 and that station in each case was in a fairly critical position in relation to the diagrammatic reconstruction of the section's main characters.

The observational data were collected in the same way and by the same means as formerly, but, with possible adverse tendencies in regard to the accuracy of the depth levels to which these data strictly apply, winds on the northern section reached force 5 and over, to force 7, at four consecutive and approximately mid-section stations, while on the southern section across the Wyville Thomson Ridge the entire section was worked in winds of forces 4 to 6, the strongest winds being experienced at three stations of the total eight.

Although only a single drift-bottle record is cited in support of the high rate of surface current as dynamically computed, in 1937, the records for the period contain several more in respect of which the most likely courses followed entail comparably high rates of drift, but these records are not cited in Table 1 because of the possibility existing that somewhat shorter routes, involving lesser speeds, may have been followed. In the case of that record which is cited in Table 1 there can be practically no doubt that from a position off the northern boundary of Faroe Bank the drifter in question reached the south-east coast of the island of Syderø, Faroe, by way of the west, north, and east of the whole island group, thus overtaking a course of just under 170 miles in the eight days between the dates of liberation and recovery at a mean daily rate of about 21 miles.

As a measure of the intensity of the Atlantic Current through the Faroe-Shetland Channel towards the end of May 1937, the figure of almost 9 Km³/hr. is thus more than 100 per cent greater than that for the corresponding period one year earlier, and again, such a difference must surely represent other differences of a substantial order.

1938

On 3-4 May 1938 the Danish research vessel *Dana*, using Nansen and reversing thermometers where appropriate, together with unprotected reversing thermometers as depth-checks in some deep levels, completed a section of eight stations between Faroe and Shetland (Figure 26). Despite the relatively great intervals of between about 30 and 35 miles between stations in three cases and the fact that the complete section occupied a period of 28 hours, intermediate between whole multiples of the semi-diurnal tide period, thus tending perhaps to reduce the accuracy of the computational results from the observations of temperature and salinity, the volume transport figure of 9·3 Km³/hr. and the associated maximum surface velocity of 7·0 miles per day agree remarkably closely, as will be seen from Table 1, with the corresponding results from the Scottish section over approximately the same line, but with three more stations, two months later (Figure 28).

It was scarcely to be expected, also, on account of the circumstances attending the traverses of the two Faroe-Shetland Channel sections of June-July 1938 by the Scottish research vessel *Explorer* (Figures 27, 28), that these should reveal such close agreement in regard to the volume transport of oceanic water across them as in the cases of most of those years already dealt with. Unprotected reversing thermometers were used for the first time on these surveys in the year under review, but the evidence is that at least one of them functioned somewhat erratically. It was further discovered after the survey that the Nansen thermometer used in the Pettersson-Nansen insulating water-bottle was probably slightly defective in registration by reason of the severance of a small bead of mercury from the main column. A small correction was made accordingly to the temperature readings from this thermometer. Thirdly, because of weather conditions, the southern section was overtaken in two parts with an interval of more than five days in mid-section.

Notwithstanding these adverse circumstances, the correspondence between the figures of 12·8 and 9·6 Km³/hr. for the southern and northern sections respectively is reasonably close, and there is support for this measure of agreement in the agreement also between the maximum surface velocities of 6·9 and 5·8 miles per day respectively, these figures in turn being supported by at least one appropriate surface drift-bottle record from off the Butt of Lewis to eastern Orkney. This bottle, assuming the most probable course round the north of the Orkney Islands, covered a distance of about 185 miles in the 28 days between the dates of its liberation and recovery, thus yielding a minimum average daily rate of drift of about 6·6 miles centred on the date 10 July. A second short-period record with a later mid-date of drift-period, namely 7-8 August, furnishes a mean minimum drift-speed of 5·7 miles per day over a course of approximately 480 miles between a liberation-position immediately south of the Wyville Thomson Ridge and its recovery-position in latitude 62°44′N on the Norwegian coast.

In point of calendar time the above *Explorer* hydrographic sections of 1938 correspond most closely with the single Faroe to Shetland section of the fourth week of June 1929 and the Faroe Bank to Butt of Lewis section of 20-22 June 1933. The former is credited in Table 1 with the intensity figure of 13·3 Km^3/hr., somewhat greater than those of the 1938 sections, while the latter on the other hand gave the very low oceanic volume transport assessment of only 3·6 Km^3/hr. So that, within the space of even a few years, it is evident that co-seasonal intensities of the Atlantic Current in the Faroe-Shetland Channel may be radically different.

1939

Although by Table 1 apparently perfect agreement obtained between the oceanic water volume transports (8·3, 8·3 Km^3/hr.) through the two sections of June 1939 (Figures 29, 30), the figures probably represent only a near approximation, depending unduly on a permissible latitude in interpolation at standard levels at a number of stations, which arises from an insufficiency of actual observations at, or near, these levels. Again, whilst unprotected reversing thermometers were employed as depth checks at the deeper stations, these did not always appear to function properly.

None the less it is significant once more that such agreement as is recorded has been achieved only by the inclusion of such irregular observations, especially, in this instance, of temperature in several cases, as would formerly for this very reason have been in all probability discarded as erroneous.

A clear instance, however, of the legitimate cancellation of recorded observations is given by the following. At station, latitude 59°44′N, longitude 7°15′W, on the southern section on 26 June 1939 the recorded observations were these:—

m	*t*°C	S‰
0	11·40	35·43
10	11·24	35·45
20	11·12	35·44
30	11·10	35·41
40	11·00	35·46
60	10·98	35·44
80	10·82	35·39
100	10·96	35·43
200	9·48	35·40
400	9·08	35·40
600	8·99	35·38
800	10·16	35·43
1050	8·93	35·37

Temperatures to 100 metres were recorded by Nansen thermometer in a Pettersson-Nansen insulating water-bottle. Even among these observations both the temperature and the salinity at 100 metres in comparison with those at 60 metres and 80 metres would seem to be out of place. These data, however, were used as recorded.

The three following sets of observations, namely at 200 metres, 400 metres and 600 metres, were taken by reversing water-bottles and thermometers in series, two reversing thermometers to each bottle, with an unprotected reversing thermometer attached to the lowest bottle, this yielding a figure of 588 metres as the true depth of the observations referred to 600 metres.

The data for 800 metres and 1050 metres were likewise derived from reversing gear in series. The unprotected reversing thermometer depth check for 1050 metres, however, gave the surprising figure of only 638 metres. A scrutiny of the vertical series of recorded observations reveals that this is almost certainly a true record of the actual depth of reversal of the lower bottle in the paired series. When the lower bottle was at 638 metres the upper bottle would be at about 638−250=388 metres, having reversed, however, considerably in advance of its arrival at this depth. By reference to the recorded observations in respect of this bottle and by comparison of these with the data for higher levels it would appear that this upper bottle reversed either between 60 metres and 80 metres or between 80 and 100 metres *while still on the run down.* The recorded observations below 600 metres depth were in this instance therefore deemed unacceptable.

It is also in no small measure corroborative of the above volume transport agreement that the respective maximum dynamic surface velocities of the two sections agree so closely at the comparatively high figure of about 13 nautical miles per day. The meagre surface drift-bottle returns for the year 1939, doubtless on account of the incidence of war, furnish no suitable record to enhance the accuracy of these computed velocities.

Only one of the pair of sections, it may be observed, was overtaken in a near whole multiple of the semi-diurnal tidal period, the other section taking 31 hours.

Almost one month after the corresponding section by *Explorer*, the Danish vessel *Dana*, within almost one complete diurnal tidal period, took serial temperature and salinity observations at eight stations in section between Nolsø, Faroe, and Flugga, Shetland (Figure 31). For computation on the lines of these investigations, the determination of the base-line, namely, the 35·00‰ isohaline was difficult in this case, especially on the south-eastern part of the section against the continental slope which is normally the vital part of the section so far as oceanic volume transport is concerned. This was on account of the great distance, nearly 60 kilometres, between the two stations on the slope and over the deepest part of the Channel respectively. None the less, the figure of 10·4 Km³/hr. is consistent and reasonable compared with the figure of 8·3 Km³/hr. for one month earlier.

Although it might not necessarily follow that the maximum surface velocity should also have increased in the interval of one month, its apparent diminution by two to eleven nautical miles per day tends to raise a doubt also as to the accuracy of the associated volume transport figures. These, however, it is reasonably certain, can be taken as at least a near approximation, sufficiently supporting the case which is even at this stage presented by the results of these investigations.

Thesis

In short, and briefly to summarise at this juncture when the incidence of war disrupted investigations for the next seven years, it would appear to be practically established on the evidence of the nine pairs of cross-sections of the Faroe-Shetland Channel which were accomplished between 1927 and 1939 inclusive, that sytematic observation of temperature and salinity does in fact provide the means of reliable quantitative assessment of the Atlantic Current in a region of natural strategic importance to the entire north-western European sea area. In other words, despite deficiencies in several respects in the original observation material and the known shortcomings of the dynamic method as developed to date, such comparatively simple and straightforward routine means would appear by these results to be available whereby to measure, and by systematic measurement quantitatively to assess the fluctuations of, a phenomenon of economic as well as of geophysical importance, namely, the oceanic water-mass incursion into the extensive fishery regions of north-west Europe; for, as submitted elsewhere (Tait, 1952), there is reason to believe that these fluctuations may be more or less closely related *a priori* to the economically significant fluctuations in occurrence, abundance, and perhaps also quality, to which the food-fish populations of these regions are unquestionably subject. As will be evident from later considerations in this report, other aspects apart from the dynamic, of the hydrography of the strategic Faroe-Shetland Channel region, may also bear directly on this question.

Recapitulation

Before passing to the consideration of further similar investigations which were resumed in 1946 and in subsequent years intensified to the extent of repetition several times in the course of a single year, the main features of the results of those years now dealt with may be recapitulated.

Pre-war investigations in the Faroe-Shetland Channel were limited to the five months of April to August inclusive, but principally to the months of May and June, that is, practically to the mid-summer period. Nevertheless, a considerable range of oceanic volume transport values, namely, from 1·4 to 14·0 Km³/hr. is recorded, indicative of very considerable fluctuation in the intensity of the Atlantic Current through the Channel. The maximum surface velocity of the Current also registered the considerable range of variation from approximately 5 to 21 nautical miles per day. Incidentally, it is a matter duly to be noted as of some significance that, from the lowest to the highest, these dynamically computed velocities so frequently and so closely agree, almost identically in most cases, with those derived from the shortest-period—and in this respect significant—returns among surface drift-bottle records which are appropriate in their estimated courses to the region and the calendar times involved. The results of two entirely independent means of investigation are thus demonstrably correlated.

Apart from their revelation of the range which may be expected, sometimes from one year to the next, in the intensities of the Atlantic Current through the Faroe-Shetland Channel—and as will be seen later this is even greater than that demonstrated by the results to 1939—the most notable feature of the volume transport figures to this point is the succession of relatively low values for the summer months of the years 1931 to 1936 inclusive, more especially for the four years 1931 to 1934. These particular years were also marked by the occurrence of particularly high salinity values in this region and also in the northern North Sea. The occurrence of considerable numbers of these extraordinary records in the latter region was earlier considered to imply extraordinarily intensive oceanic influence, but the dynamic results of this investigation clearly veto this earlier inference. As concluded in a later part of this report they have quite another, and probably, from a biological standpoint, no less significant meaning.

The lowest and the highest oceanic transport values of this first part of Table 1, the latter in marked contrast to the above-mentioned succession of low values commencing only two years later, and well substantiated not only by concordant results from the Channel itself but also by a fourth contemporary assessment immediately northward beyond the Channel proper, refer to the years 1927 and 1929 respectively, a difference in time of less than two years. The interesting point is raised also as to whether the lowest transport value, namely 1·4 Km^3/hr., which is the lowest of all the records of Table 1, may be associated with the phenomenal occurrence of an iceberg within the limits of the northern North Sea in October 1927, that is, practically within two months of the above apparently abnormally low oceanic volume transport assessment.

Considering the volume transport agreements recorded in the nine cases of contemporary pairs of sections between 1927 and 1939, in conjunction with the duration-periods of each section, or of all but a single terminal station of a section, it is to be observed from Table 1 that, in only three of these cases were both sections overtaken within about three hours of a complete multiple of the semi-diurnal or, as the case may be, the diurnal, tidal period. In the other six cases one of the sections was accomplished within this time-interval nearly related to a tidal period, the duration of the other section in each case being nearly midway between 12n and 12(n+1) hours, n being an integer.

Again, it is noticeable that in two of the five cases of poorest agreement between the paired volume transport magnitudes, namely those for May 1929 and June 1933, one of the sections of each pair shows almost the maximum departure of ±6 hours from 12n hours, but, on the other hand, the pair of sections with the greatest discrepancy between their oceanic volume transport magnitudes, those for June-July 1938, (although the additional prejudicial factor of interruption in mid-section intervenes in one case), were both overtaken within periods of 12n ±3 hours. Oppositely, as it were, in one of the three cases of apparently perfect volume transport agreement, namely, that for June 1939, one of the pair of sections occupied 12n—5 hours.

On the whole, therefore, it would not appear that the possible effects on the dynamic computations of the displacement of the water-masses due to internal wave action, were of other than comparatively minor moment in these Faroe-Shetland Channel investigations, recognising that the aim, although quantitative, is the evaluation of the aggregate, or resultant, conditions of transport within the period of time occupied by each section.

Post-war Faroe-Shetland Channel traverses up to the year 1952 are now to be considered on the same lines of dynamic evaluation as those adopted in the foregoing study.

The Volume Transport of Oceanic Water, 1946-1952*

1946

The only complete traverse of the Faroe-Shetland Channel in 1946 save for the nearer Faroe shelf waters which are usually included in the hydrographic section between the Shetland and Faroe Islands, was that undertaken by the Danish research vessel *Dana* in 33 hours between 26-27 August (Figure 33), when nine stations were occupied from the northmost point of Shetland towards Nolsø Island, Faroe, that is, on the section of eleven stations normally worked by the Scottish research vessel between these terminals.

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*Figures 32-81 refer.

The above *Dana* section has already been reported by Smed (1948, pp.10-12). Smed's dynamic computations, however, were made on different bases from those on which the present investigation is founded, the latter being designed to measure the volume transport of oceanic water only. Smed's results therefore are not strictly comparable with those now given. Even the lower of his volume transport figures for the above section, namely 8·2 Km³/hr. based on a deeper zero-current level of 800 metres, is more than 60 per cent greater than the figure of 5·0 Km³/hr. calculated on the new basis. It is obvious from Figure 33, however, that the 800 metres depth level was well within the bottom Norwegian Sea water-mass of negative temperature and salinity of 34·92‰, which was in all probability moving southward at a slow rate along the bottom of the Channel, thus tending to exaggerate Smed's figure as a measure of northward transport of oceanic water. His maximum uppermost water velocity of 17 cm/sec (8 nautical miles per day), recorded between the same pair of stations as the tabulated figure of 6·0 nautical miles per day in Table 1, is likewise almost certainly somewhat greater than reality, an inference which is supported by the shortest-period surface drift-bottle record among a number of short-period results appropriate to the time and region involved.

From the station, latitude 61°08′N, longitude 2°10′W, of 21 July 1946, a drifter reached the Norwegian coast in latitude 66°08′N, eighty-five days after liberation. Assuming a direct route between liberation-position and stranding-place, i.e., without eddy complications, which is a primary assumption in cases of shortest-period drift-bottle returns, this leads to the deduction of an average drift-speed of 5·9 nautical miles per day centred on 1-2 September 1946, less than one week after the *Dana* hydrographic section above mentioned. Five more short-period drift-bottle returns from July liberations northwest and due east of the northmost point of Shetland similarly yield minimum average drift-speeds of between 5 and 6 nautical miles per day within the first few days of September.

Before passing from this matter of maximum hydrodynamic velocities it may be mentioned that, no doubt on account of the superficial freshening influence on the August section which is considered in the descriptive section of this report, a slightly greater maximum velocity (namely 6·6 miles per day) than that pertaining to the surface water is dynamically derived in respect of the 25-metres level between the same pair of stations.

1947

The usual pair of hydrographic sections from the Butt of Lewis to Faroe Bank and between Shetland and Faroe, with only eight days between them, was accomplished by *Explorer* in the month of June 1947 (Figures 34, 35). In the following month the Danish research vessel *Dana* covered the latter section (Figure 36). In the case of the Scottish sections no depth corrections were applied due to the lack of unprotected reversing thermometers, but again wind force only occasionally reached Beaufort Force 3 and in consequence wire angle was negligible. Depth corrections were, however, applied to the *Dana* observations at the deep stations between Faroe and Shetland. The two Scottish sections, as Table 1 indicates, were overtaken approximately in the period of three consecutive semi-diurnal tidal periods of about 12 hours each and the *Dana* section in two such periods.

Only the following amendment had perforce to be made to the Scottish observations. At the position, latitude 60°35′N, longitude 8°00′W, between the Wyville Thomson Ridge and Faroe Bank, both the temperature and the salinity observations as recorded for 500, 700, and 890 metres, were obviously wrong, indicating that the series of three reversing water-bottles by which they were taken had reversed while being lowered to the levels for which they were intended. Values for these depths, or at least to 550 metres for the purposes of hydrodynamical computation, had therefore to be extrapolated from curves of temperature and salinity against depth. By the trends of the curves the extrapolations were made relatively easily and are acceptable with reasonable confidence.

A further note regarding the Faroe-Shetland Channel section may appropriately be mentioned here. As can be seen from Figure 34 the extreme irregularity of the 35·00‰ isohaline on this section rendered the estimation of its mean depth between stations a matter of no little difficulty, particularly between the two successive pairs of stations in mid-Channel between longitudes 4°15′W and 3°10′W. Obviously, from Figure 34, the arithmetical means between the levels of intersection of the station verticals with the 35·00‰ isohaline do not in these two cases give an accurate estimate of the mean level of the base of the oceanic water-mass. By inspection the true mean base levels probably lay a little deeper in the one case and somewhat less deep in the other, than the respective arithmetical means. The section diagram Figure 34 was, like its fellows, originally drawn on square-millimetre paper and in order to arrive at a truer mean level of the base of oceanic water between the stations concerned the following procedure was adopted. The square root of the difference between the areas on either side of the straight line joining the levels of intersection of the station verticals with the 35·00‰ isohaline was converted, according to the scale of the diagram, into the vertical depths thus represented by the areal difference and this depth was added to, or subtracted from, the arithmetical mean level as the case required.

From these premises the remarkably close agreement recorded in Table 1 between the oceanic water volume transports through the two sections resulted at a figure which is the highest so far accruing from these investigations. The computed maximum surface velocities of 11·1 and 13·8 miles per day respectively, while not in such relatively close agreement as are the volume transports, are sufficiently close to justify their acceptance as at least near approximations to reality.

A surface drift-bottle record from a liberation-position over Faroe Bank to recovery on Sandø Island, Faroe, yields an average velocity figure of 12·2 miles per day centred on the 27-28 June on the assumption of a course approximating to the appropriate parts of the routes shown on Figure 4, that is, by way of the west and north of the Faroe Islands. A second Faroe recovery on a similar supposition and travelling from almost the mid point of the Wyville Thomson Ridge also to Sandø Island *via* the west and north of the Faroe group, can be reckoned thus to have covered approximately 300 miles at a mean speed of 11·1 miles per day, representing the actual surface drift-speed on about the 1-2 July. It happens in the particular year under review that none of the Norwegian coast recoveries in higher latitudes from liberations in the Faroe-Shetland Channel during the month of June 1947 (there was none earlier in that year), leads on a first analysis to an average drift-speed nearly approaching those of the above-mentioned Faroe records. Their mid-dates of passage, also, on account of the drift-periods involved, fall considerably later than those cited for the Faroe results and consequently, although they may represent approximately true records of surface-drift velocity of about 9½ miles per day about mid-July and about 8 miles per day in the beginning of August, they are scarcely relevant citations in support of the hydrodynamical surface velocities pertaining to the middle two weeks of June, as given in Table 1.

It is further of interest, as of later import, to note the two following short-period surface drift-bottle records as in all probability indicative of a similar strengthening of the Atlantic Current through the Faroe-Shetland Channel in the autumn of 1947 (Tait, 1949) as is revealed hydrodynamically in respect of the corresponding periods of subsequent years for which the necessary observational data are available.

(1) From latitude 59°48′N, longitude 5°44′W, on 16 August 1947, a drifter passed to the Norwegian coast in latitude 65°42′N in only 42 days, entailing thus a minimum direct passage of about 600 miles overtaken at an average speed of 14·3 miles per day centred on the date 6 September 1947.

(2) Similarly, a 20-day passage from latitude 61°01′N, longitude 1°00′W on 26 October 1947, to latitude 62°47′N, longitude 7°00′E, involves an average drift-speed of 12½ miles per day over a route of approximately 250 miles, this figure being applicable on the convention already mentioned as an absolute surface current velocity between these two positions, on 5 November 1947.

Turning to the dynamical results from the *Dana* section between Faroe and Shetland almost exactly one month after the later of the two Scottish sections, the volume transport figure of 15·8 Km³/hr., although still a high one, indicates that in the month's interval between June and July 1947, the intensity of the Atlantic Current in the Faroe-Shetland Channel had declined. The maximum surface velocity bears a similar interpretation and conforms to the indications also of surface drift-bottle record velocities. The velocity for July, as computed, is probably somewhat low. Two contiguous parts of the *Dana* section gave relatively high volume transport assessments (see Appendix II), and it is with the lower of these that the above maximum velocity is associated. The position may be that, owing to the situations of the observation-stations relative to the core of the Atlantic Current, the maximum velocity computations in each case are masked to some extent by lower speeds within, but towards the outsides of, the two parts of the section. It is to be noted that the above volume transport figure of 15·8 Km³/hr. is considerably in excess of the greater of the two calculated by Hermann (1949) for the same section but from a much deeper base level.

There can be no doubt that the summer of 1947 was marked by a particularly strong Atlantic Current through the Faroe-Shetland Channel, probably at about its peak strength in June, waning thereafter until perhaps about the beginning of August, but apparently reviving in intensity about one month later and flowing strongly again at least until the beginning of November.

1948

Within less than one week in the first half of May 1948 the research ship *Explorer* covered both of the now standard hydrographic sections between the Faroe Bank and the Butt of Lewis and between Faroe and Shetland respectively (Figures 37, 38), although still the former section lacked certain stations in strategic positions which were inserted in the following year in order to introduce in these positions, which are in a sense critical for the results, somewhat greater precision in the dynamic computations. In particular, it was desirable to eliminate as far as possible the degree of latitude remaining in the construction on sectional diagrams of the isosteres towards the slopes of the Faroe Bank and of the continental shelf, the depths of the isosteres on the slopes being material to the estimation of the dynamic depths of the next neighbouring stations on Bank or shelf respectively.

Approximately one month later, the Danish research vessel *Dana* worked a line of eight stations between Faroe Bank and Sulisker Bank (Figure 39) to the northward of the Butt of Lewis (see Figure 1). Except for the station near Sulisker Bank the remaining seven positions were those, or very near to those, of seven stations on the normal Scottish hydrographic section between Faroe Bank and the Butt of Lewis. Again, towards the middle of August, *Dana* made observations along the 11-stations Faroe to Shetland hydrographic section (Figure 40).

Where necessary, depth corrections for the deeper levels were made on all sections by means of unprotected reversing thermometers. For the most part these corrections were of small magnitude.

The time intervals of the above four sections as given in Table 1 show that in three cases the period was to within about three hours a multiple of the semi-diurnal tidal period. The fourth, distinctly aberrant, case in this respect referred to one of the paired sections of early May by *Explorer*.

Good agreement is again recorded between the contemporary volume transports of oceanic water across the two sections of May 1948. The maximum surface velocities on the other hand are not in such close accord. Unfortunately there is no suitable surface drift-bottle record for the period and region concerned to which to relate the computed surface velocity figures.

As a measure of the intensity of the Atlantic Current through the Faroe-Shetland Channel in the first half of May 1948 the volume transport figure of approximately 6 Km³/hr. is probably at least fairly accurate. One month later, according to the figure of 8·9 Km³/hr. for the region over the Wyville Thomson Ridge, the Current had evidently strengthened quite considerably, in further evidence of which the associated high surface velocity of 13·4 nautical miles per day is testimony. After a further two months it would appear that the intensity of this oceanic current in the Faroe-Shetland Channel had diminished to almost half of its June strength.

None of these figures for 1948 is particularly remarkable, but they begin to show something of the scale of variation in intensity to which this important hydrographic influence in north-west European seas is subject within even the short space of three months. Further information on the probable course of events later in the year was derived from surface drift-bottle returns (Tait, 1949) which plainly indicate minimum surface drift-speeds of the relatively high order of 13 to 14 miles per day in the northern North Sea in October 1949, indicating, in turn, and for at least the second consecutive year, strong and evidently increasing oceanic influence in the region by way of the Faroe-Shetland Channel in the late autumn.

1949

Four attempts were made during 1949 between the months of March and November inclusive to secure approximately synchronous observations on the pair of Faroe-Shetland Channel sections upon which this dynamic investigation of the intensity of the Atlantic Current therein is mainly based. Owing to weather conditions, only two of these attempts, in September and November respectively, succeeded, one of them only partially. In addition there began to be worked in 1949—in the months of May and September in the one case and in March, July and September in the other—two short sections on the west and to the north of the Faroe Islands respectively (see Figure 1), the former an extension of the Butt of Lewis to Faroe Bank Section, which were aimed at encompassing oceanic waters progressing northward or north-eastward through these regions.

In the beginning of March the Butt of Lewis-Faroe Bank section, now numbering twelve stations, had to be abandoned halfway, but between the 8th and 10th days of the month the section from Faroe to Shetland was completed (Figure 41), yielding a figure of 7·3 Km³/hr. for the intensity of the Atlantic Current with a maximum surface velocity of 8·4 nautical miles per day. But for the support which the latter value obtains from a number of the shortest-period surface drift-bottle returns appropriate to the period and region, these figures, because they derive from only a single section, should probably be appraised as only approximate measures. The support, however, seems to be such that these assessments of the dynamics of the Atlantic Current in the beginning of March 1949 may be accepted with reasonable confidence.

In point of both area and time the nearest appropriate surface drift-bottle record, furnishing a mean surface velocity of 8·6 miles per day about the mid-date of its drift-period, namely 13-14 March, is that of a bottle from a position 50 miles north-west of the Butt of Lewis to St. Magnus Bay, Shetland, in 21 days. On a course almost directly from liberation-position to stranding-place, it is reckoned that this drifter travelled approximately 180 miles at the mean rate of 8·6 miles per day. Several more drifters, all of them from the Faroe-Shetland Channel region in March, entailed minimum average drift-speeds of between 7·4 and 8·8 miles per day from the beginning to nearly the middle of April 1949. Except for one result these later figures hold the implication of slowly declining velocity during April, a tendency which would seem to be in accordance with the next dynamically derived Atlantic Current speed of just under 4 miles per day in the early part of May 1949.

Before considering this month's conditions, however, reference is made to a short section running due north from Faroe (Figures 1, 46a) which was worked by *Scotia*, an addition to the Scottish research fleet, on 6-7 March 1949, in conjunction with the Faroe-Shetland section above-considered. The former section was designed to traverse completely the Atlantic water-mass entering the Norwegian Sea by way of the west and north of the Faroe group and as can be appreciated from Figure 46a the object was achieved.

Reporting upon a similarly disposed pair of hydrographic sections performed by *Dana* in August 1948, Hermann (1949b) cites the results of computations of volume transport which were carried out on a different basis from that underlying this investigation as evidence of the approximate equality in magnitude in August 1948 of the incursions of the oceanic water-mass into the Norwegian Sea by the Faroe-Shetland Channel route and by that west and north of Faroe respectively.

On the same basis as throughout this entire investigation, and notwithstanding that there may be somewhat less confidence in the underlying assumption than in regard to the Faroe-Shetland sections, the volume transport of oceanic water through the *Scotia* section due north of Faroe in March 1949 was computed on the basis of the 35·00‰ isohaline as the zero horizontal current level. The result of just under 2 Km³/hr. as given in the appropriate part of Appendix II* compares with that of 7·3 Km³/hr. in Table 1 in respect of the contemporary Faroe-Shetland section, the respective maximum surface velocities on the two sections being 5·9 and 8·4 nautical miles per day. These figures imply, as has long been suspected, that the oceanic incursion into the Norwegian Sea to the west and north of the Faroe

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*As is indicated there, the northmost station of the section was interpolated. Reference to Figure 46*a* shows that the interpolation was made practically midway between the two final stations of the section as actually performed. The object of the interpolation, which was made directly from Figure 46*a*, was to achieve a more accurate computation of the volume transport of oceanic water eastward through the section than would have accrued from a computation including the observations at the final station which obviously, by these observations, lay completely within the East Icelandic Arctic Current.

Islands is of considerably lesser magnitude than the Faroe-Shetland Channel influx, an inference which seems to some extent to be borne out by the difference also in the above maximum surface velocities. In any case by the evidence of drift-bottle courses denoting water circulation in the region, it is practically certain that some at least of this secondary oceanic incursion into the Norwegian Sea by the west and north of Faroe deviates southward again into the Faroe-Shetland Channel on the east side of Faroe, to merge with the main north-easterly stream along the eastern side of the Channel.

Further to the above circumstances the Butt of Lewis to Faroe Bank section of the end of April and the beginning of May 1949 was extended considerably northwestward of the latter terminal to embrace that part of the Atlantic Current which flows northward on the west side of Faroe Bank and, in part again (for some of it enters the Faroe-Shetland Channel region between Faroe Bank and Syderø, Faroe), to the west of the Faroe Islands. To maintain the uniformity of Table 1, however, only the hydrodynamical result for the main and undoubtedly the essential and significant part of the Atlantic Current over the Wyville Thomson Ridge between Faroe Bank and the Butt of Lewis is there given. For the remainder of the section north-westward to its terminal at the position, latitude 62°15′N, longitude 9°30′W, assuming zero-current level along the sea floor save where the 35·00‰ isohaline appears between about 670 metres and 750 metres immediately north-west of Faroe Bank (see Figure 42), volume transport of oceanic water in a north-easterly direction works out at scarcely 1·3 Km^3/hr. It is perhaps not altogether coincidental that this magnitude bears almost exactly the same ratio to the volume transport (5·2 Km^3/hr.) across the Wyville Thomson Ridge at the same time (see Table 1), as does the oceanic transport of 1·9 Km^3/hr. eastward to the north of Faroe in the early part of March 1949 to the corresponding intensity (7·3 Km^3/hr.) of the Atlantic Current through the contemporary section from Faroe to Shetland. This circumstance may perhaps be taken to give some measure of support to the oceanic volume transport result of April-May 1949 across the Wyville Thomson Ridge, since, not only is the result a relatively low one, but it is to be observed also that the section as a whole was broken in time, an interval of a week elapsing between the two adjacent stations immediately south-east of the Faroe Bank which is often a critical position relative to the Atlantic Current as it enters the Faroe-Shetland Channel

It would appear therefore that the foregoing figures are probably fairly accurate, notwithstanding that as shown by Figure 42 the Atlantic water-mass north-west of Faroe Bank was not completely embraced by the section. The rapid fall in salinity between the two terminal stations of the section, however, to values within 0·1‰ of the recognised limit—namely, 35·00‰—of oceanic water, indicates that the western boundary of this water-mass lay only a very little distance beyond the north-western extremity of the section, and in any case, as the dynamic computations show (Appendix II, p. 246), the resultant volume transport between the two last stations of the section was strongly southerly, so that the section almost certainly embraced all of the northerly oceanic water transport to the north-west of Faroe Bank.

As Table 1 reveals, the maximum dynamic surface velocity on the Faroe Bank-Butt of Lewis section of April-May 1949 is computed at 3·8 nautical miles per day, and this value is practically confirmed by a peculiarly appropriate and singular drift-bottle result which yields a mean speed of 3·4 miles per day centred on 12-13 May 1949 over an almost direct course from a position ten miles due north of the Butt of Lewis to the west side of Orkney.

So that there would appear to have been a considerable decline in the intensity of the Atlantic Current through the Faroe-Shetland Channel in the two months' interval between the beginning of March and the beginning of May 1949.

The next traverse of the Channel to be carried out in the year under review was on neither of the two main lines of stations normally occupied, but comprised eight positions on a line between the Munken Rock at the southern extremity of the Faroe group and the Island of Hoy, Orkney. This traverse was made by *Scotia* on the two last days of July 1949. As can be appreciated from Figure 43 the section is not in some respects a particularly good one, but, computed in precisely the same fashion as before, its oceanic volume transport north-eastwards is assessed at 11·5 Km^3/hr. with maximum surface velocity of 9·3 nautical miles per day, both very considerable increases on the corresponding figures for about the beginning of the month of May, that is, nearly three months previously. Specific surface drift-bottle records from which minimum surface drift-speeds can be calculated for the region concerned are not available, but as was noted in a report of general hydrographic conditions for the year in the northern

North Sea and neighbouring waters (Tait, 1950), accession to the strength of the Atlantic Current during the summer of 1949 was almost certainly the primary cause of increased numbers of drift-bottle strandings during the summer farther south on the eastern North Sea seaboard than is normally the case.

One week before the above section from Faroe to Orkney, *Scotia* repeated the line of six hydrographic stations due north of the Island of Viderø, Faroe, which were accomplished for the first time in the beginning of March 1949. On this second occasion, as can be seen from Figure 46b, the oceanic water-mass was not completely crossed, but the indications of both isotherms and isohalines are that the outermost terminal station on latitude 62°30′N was within a very short distance of the northern boundary of the Atlantic water streaming eastwards round the north of the Faroe Islands. Computation of the volume transport of the water-mass on the same basis as before works out at just over 3 Km³/hr., which is again approximately one quarter of the intensity of the contemporary Atlantic Current through the Faroe-Shetland Channel. Maximum surface velocity at 10 miles per day also agrees fairly nearly with the corresponding Faroe-Orkney figure above, of 9·3 miles per day.

The first completed pair of the standard, strategically placed, Faroe-Shetland Channel sections in 1949 was accomplished only in the month of September, with an interval of a little over one week between the two sections (Figures 44, 45). As shown in Table 1, reasonably close agreement in the volume transport of oceanic water through these two sections was calculated, but certain circumstances attendant upon this agreement must be mentioned since they involve some slight departure from the strict procedure followed in all these investigations save for this one instance.

In the first place the normal depth-checks by the use of unprotected reversing thermometers at the deeper levels of deep-water stations could be carried out only along the southern section, breakage of the one remaining thermometer of this type at the first of the appropriate stations on the northern section precluding these checks in the deep Channel between Faroe and Shetland. In the light winds of Beaufort force 3 and less which were encountered on the northern section, depth corrections for wire angle would in all probability have been small and of no great consequence accordingly in the final result. Nevertheless, the higher figure of 12·4 Km³/hr. pertaining to the southern section is almost certainly the more accurate result as in this instance the appropriate depth-checks were applied to the original observational data without alteration exception at one station—latitude 59°31′N, longitude 7°05′W.

At this position the depth-check by unprotected reversing thermometer on a series of four reversing water-bottles at 300, 400, 500 and 600 metres according to the depth-gauge, showed the lowest bottle of this series to have been triggered at approximately 306 metres depth, the three higher bottles having been still more prematurely closed. This inference is corroborated by the temperature and salinity observations recorded against these bottles as at the depth-gauge levels, in comparison with the registrations at lesser depths made by the Nansen thermometer in conjunction with the Pettersson-Nansen water-bottle. The lowest of a second, deeper, series of three reversing water-bottles, however, to 700, 800 and 1000 metres by depth-gauge, functioned, according to unprotected reversing thermometer correction, at only 894 metres, which depth was used in the construction of a shallow catenary curve closely similar to those in respect of neighbouring stations on the section and furnishing the means of interpolating temperature and salinity data for the 300 to 600 metres levels.

On the northern section, however, between Faroe and Shetland, and using the observational data exactly as recorded for the construction of Figure 45 which illustrates the temperature-salinity distributions on the section and from which the mean depths of the 35·00‰ isohaline between successive pairs of stations was determined, the first dynamical assay for the volume transport of oceanic water through the section yielded a figure of only between 2 and 3 Km³/hr.

Explanation of the discrepancy between this assessment and that in respect of the southern section, which by the weight of evidence of this whole investigation it was difficult to accept as an expression of fact, was by no means easy to find. In addition to the afore-mentioned cumulative weight of evidence there is the fact that, as shown by comparison of Figures 44 and 45, a fairly close correspondence obtained between the temperature and salinity distributions on the two sections, thus further discounting the actuality of the apparent dynamical disagreement between them. The crux of the matter seemed to be the low transport figures derived from the first assay in respect of that part of the northern section embracing the upper part of the continental slope over against Shetland. Three stations are involved, one of them on the continental edge. At the two neighbouring stations seaward, particularly at the nearer of the two, in depths of 300-400 metres in one case and 400-500 metres in the other, the low salinity registrations of 34·83‰ to 34·88‰ reveal the presence of East Icelandic Arctic Current water within at most 50 to 100 metres of the base of the oceanic water-mass. The vertical proximity of the two water-masses indeed at the two stations concerned warrants the assumption that in the vicinity of the continental slope at least they were in fact in immediate vertical juxtaposition without any intervention of intermediate salinity water indicating the presence of bottom Norwegian Sea water. On this assumption, involving departure from the strict rule of horizontal and vertical salinity interpolations between the 400 metres and 500 metres depth levels between the two stations particularly involved, the 35·00‰ isohaline was constructed in relation to the 34·85‰ isohaline as shown in Figure 45 and the dynamic computation repeated with the result recorded in Table 1 (10 Km³/hr.).

In achieving the above-mentioned closer agreement between the oceanic volume transport figures for September 1949, the maximum surface velocities by dynamic computation also came into closer relationship with each other, and the velocities thus obtained of 9·1 and 8·3 miles per day respectively are in turn supported by the two shortest-period surface drift-bottle results on record embracing the period and region concerned. One of these almost certainly coursed through the entire length of the Faroe-Shetland

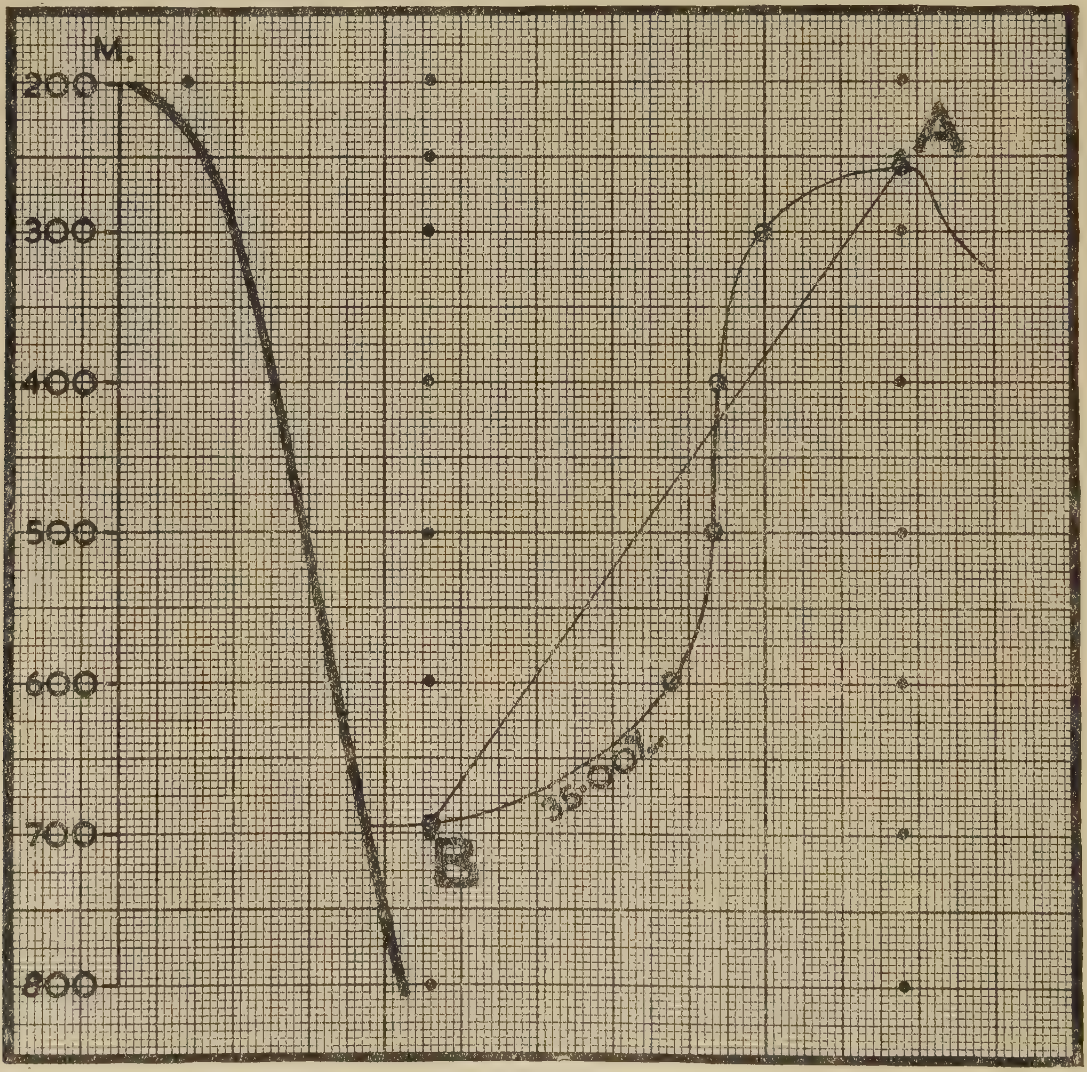

Fig. 5 Enlarged reproduction of part of Figure 48 to illustrate the method of determining the mean depth of a markedly undulating 35·00% isohaline between a pair of stations on a hydrographic section.

Channel in its passage from a position in the south-eastern vicinity of Rockall to the Norwegian coast in latitude 63°25′N between mid-July and the beginning of October 1949. Its route therefore measured approximately 750 miles which would presumably be overtaken in the 84 days involved at an average rate of 8·9 miles per day centred on the date, 23 August 1949. The other bottle, from a position some 45 miles due north of Faroe on longitude 6°35′W, probably drifted eastward and south-eastward into the northern reaches of the Faroe-Shetland Channel, entering there the main Atlantic Current by which it was borne to Norway in latitude 64°49′N. The whole course from 7 September 1949, occupied 56 days thus implying over a route of approximately 555 miles an average daily speed of about 9·9 miles per day, the mid-date of the drift-period being 5 October 1949. These two results bracket, as it were, the period of the two Faroe-Shetland Channel cross-sections in the month of September.

As in the beginning of May 1949, the Butt of Lewis to Faroe Bank section of the September following was extended north-westward considerably beyond the Bank to the position, latitude 62°02′N, longitude 9°18′W. In the latter month, however, Figure 44 gives little indication from the salinity distribution of how near to the north-western boundary of the oceanic water-mass this extension to the section attained. At the same time the extension beyond Faroe Bank yields an oceanic volume transport figure of 3·4 Km^3/hr. with maximum surface velocity of only about 0·5 nautical miles per day. The ratio of the two volume transport measures is again, as was found earlier in the year, approximately 1:4; so that in all probability the extended section in September 1949 again all but embraced the entire oceanic water-mass heading towards the Norwegian Sea from the North-Eastern Atlantic Ocean.*

As Table 1 shows, the two standard Faroe-Shetland Channel sections were again traversed in the month of November 1949, the first occasion on which they were accomplished so late in the year. Despite the facts that the two sections were separated in time by an interval of more than eleven days, that the northern section (short of one station in mid-section) was worked under conditions of continuously strong winds of Beaufort Forces 5 to 6 and rough seas, the volume transport agreement between the two sections appears to have been very close at the relatively high figure of about 14 Km^3/hr. The maximum dynamic surface velocities, however, fail in this case to agree and there are no suitable surface drift-bottle records to give any indication as to which of the two computed maximum velocities may be nearer to the truth. In all the circumstances that for the southern section, namely, 15·6 nautical miles per day, seems the more likely figure in that the southern section was overtaken in more amenable weather and sea conditions than the northern one. Its dynamical computation, also, rests on the whole on a firmer basis and although as noted in Table 1 no singular surface drift-bottle record exists which would tend to confirm the figure, the general interpretation of the hydrographical conditions, especially of temperature and salinity distributions, over a wide region including the Faroe-Shetland Channel, and of the maximal incidence of drift-bottle recoveries on the Norwegian coast in the previous month of October, would seem to argue that gradual build-up in the intensity of oceanic influence in this region throughout the autumn and at least the early winter of 1949 which is indicated by the volume transport figures for the end of July, the beginning of September, and the month of November, as these are given in Table 1.

The above reference to the basis on which hydrodynamical computations have been made in these investigations prompts the particular citation once more—a similar instance was quoted in reference to the June section of 1947—of the method of arriving at the mean depth of the 35·00‰ isohaline between successive pairs of stations on the northern section when that isohaline has such a marked undulatory form as that illustrated in mid-section in Figure 48. The arithmetical mean of the depths of the isohaline at the two stations concerned is 475 metres, but it is obvious that in cross-section a considerably greater bulk of water lies below than above the straight line joining the depths of intersection of the isohaline with the two station verticals and that therefore, from the standpoint of the translation of water-mass, the arithmetical mean of these two depths is appreciably inaccurate. To arrive at a more reasonable mean depth of translation the following procedure has been adopted in such cases. For clarity in demonstration the relative part of Figure 48 is reproduced in enlargement in Figure 5, the ground of which is millimetre squares.

*As stated on p. 88, the short section due north of Faroe from the island of Viderø, on longitude 6°35′W, was also worked in September 1949, five days in advance of the main Faroe to Shetland cross-Channel section. Reference to Figure 46*c*, however, shows that not only were but four stations of this short section completely achieved—the section had to be abandoned because of storm conditions—but also that the temperature-salinity distributions on the section were apparently highly irregular, the oceanic water-mass being evidently interrupted between about 500 and 600 metres on the northern slope of the Faroe submarine plateau by the intervention of deep Norwegian Sea water. Dynamic assessment of the oceanic water-mass on this short and obviously incomplete section was not therefore attempted.

To the above arithmetical mean depth of the 35·00‰ isohaline between the two stations concerned is added five times (since in the vertical scale 1 mm represents 5 metres in depth) the square root of the difference between the numbers of square millimetres below and above the straight line AB to the curve of the 35·00‰ isohaline. That is, in the present instance, the areas of the figures ACD and CBE being b and a square millimetres respectively, the mean depth of the 35·00‰ isohaline between the points A and B is taken to be:—

$$\begin{aligned} & 475+5\sqrt{a-b}\text{ metres} \\ \text{i.e. } & 475+5\sqrt{643-253}\text{ metres} \\ & =475+98{\cdot}75\text{ metres} \\ & =475+100=575\text{ metres approximately.} \end{aligned}$$

It is not without significance to observe that, once again as in June 1947 and indeed in some earlier years, as for instance in May 1937, the close agreement registered in volume transport of oceanic water through the two sections of November 1949 materially depends upon the foregoing careful estimate of the mean depth of the 35·00‰ isohaline where its course between two stations is so strongly undulatory. The great difference, however, between the maximum hydrodynamic surface velocities on the two sections is less susceptible of interpretation, unless it be connected in some way with the circumstance that, as can be seen from the appended tables of the computations, the high volume transport recorded between one pair of neighbouring stations on the southern section does not have its counterpart on the northern section. On the latter, the transports between no less than three successive pairs of stations are approximately the same at much lower figures the aggregate of which, however, approximates very nearly to the maximal transport figure between the single pair of stations on the southern section. From this and the few similar instances in Table 1 it would seem that near equivalence of maximum surface velocities on the two sections may not always be associated with agreement in oceanic volume transports.

It is to be observed in conclusion that at least three of the four main sections of September and November 1949 were not accomplished within reasonably near approximation of a complete multiple of the semi-diurnal tidal period of about 12 hours, thus perhaps introducing an incommensurable error, as warned by Defant (1950), into these calculations.

1950

In 1950 the paired Faroe-Shetland Channel sections were worked in May (Figures 50, 51) by *Scotia*, in June (Figures 53, 55) by *Scotia*, and in July-August (Figures 56, 57) by *Explorer* respectively; the southern section singly was overtaken by *Scotia* in March (Figure 49) and November (Figure 59), and the northern section alone in May-June (Figure 52) and in August (Figure 58), both by *Dana*. The southern Butt of Lewis-Faroe Bank sections of March and May were extended beyond Faroe Bank to their intersections with longitudes 9°30′W and 9°18′W respectively, while in March, May, and June, the short section on longitude 6°35′W due north of Faroe to latitude 63°30′N, introduced in 1949, was traversed by *Scotia* (Figures 54a, b, c).

Although attributable only to the natural conditions of wind and sea it is unfortunate that the original observations on the section from the Butt of Lewis north-westward over Faroe Bank in the early days of March 1950 (Figure 49) should possess certain shortcomings which entailed extrapolation (after depth corrections applied from unprotected reversing thermometer registrations) for the deepest levels at two important stations from the standpoint of the dynamics of the Atlantic Current over the Wyville Thomson Ridge. Nevertheless there is evidence that the high result of 15·7 Km^3/hr. for the period concerned was probably at least a near approximation to actual conditions.

Earlier evidence from surface drift-bottle records, for instance (Tait, 1950, p. 84), indicates that, after a short winter period of regression in its autumn intensity in 1949, the Atlantic water influx into both the Norwegian Sea and the northern North Sea from the Faroe-Shetland Channel strengthened considerably in the month of March 1950. Further evidence in support of the high intensity figure for March 1950 accrues by analogy from the relationship previously found on more than one occasion in these investigations to obtain between the oceanic volume-transports through the Faroe-Shetland Channel cross-sections and those through contemporary short sections north-west of Faroe Bank and due northward from the Island of Viderø, Faroe.

Computations for four different periods in 1949 demonstrate that the intensity of the Atlantic Current through the Faroe-Shetland Channel proper may be expected to be very nearly four times that of the oceanic water-mass proceeding into the Norwegian Sea by way of the west and north of the Faroe Islands. In the month of March 1950, both the above-mentioned shorter sections athwart the Atlantic stream west and north of Faroe and all but completely embracing it, were worked within a day or two of the main section between Faroe Bank and the Butt of Lewis. Owing to the lack, after appropriate depth corrections, of observations for the deepest levels north-west of Faroe Bank (see Figure 49), the depth of the 35·00‰ isohaline can be estimated only approximately for a part of this short section. Nevertheless, the oceanic volume-transport figure of 3·6 Km³/hr. found in this case compares with 4·0 Km³/hr. for the short section due north of Faroe (Figure 54a), and both obviously bear the same approximate ratio of 1:4 to the Atlantic Current intensity over the contemporary Wyville Thomson Ridge section as has previously emerged from exactly similar calculations in 1949. Both the short sections above in March 1950 yield also practically the same maximum surface velocity of about 7½ nautical miles per day.

The maximum hydrodynamical surface velocity of 13·3 nautical miles per day which is associated with the volume transport figure of 15·7 Km³/hr. for the Butt of Lewis-Faroe Bank section is not in this case supported by any surface drift-bottle record, the nearest velocity from such records as involve the region and approximate period of the hydrographic sections being 9 miles per day in respect of a drifter which travelled in 24 days over an estimated course of 215 miles from a position 35 miles north-west of the Butt of Lewis to the west coast of the mainland of Shetland, the mid-date of the drift-period being 26 February 1950.

Next come the pair of sections between the Butt of Lewis and Faroe Bank and between Shetland and Faroe (Figures 50, 51), worked respectively between May 12 and 13, and May 21 and 23, that is, with an interval of about ten days between them. The southern section occupied 29 hours, and the northern section, 36 hours. The oceanic volume transport results and the maximum surface velocities (Table 1) between the two sections agree fairly nearly at the remarkably low figures, however, in relation to those of the first week of March, of only about 3 Km³/hr. and 3½ nautical miles per day respectively, implying thus a very marked decline in the intensity of the Atlantic Current in the two to two and a half months interval.

None of the comparatively few higher latitude Norwegian coast drift-bottle recoveries from Faroe-Shetland Channel liberations covering the calendar period of these hydrographic sections of May 1950 yields an average drift-velocity which is comparable with the maximum hydrodynamic velocity above. On the other hand, at least two east Shetland recoveries from a liberation-position within ten miles north-west of Flugga, Shetland, on the first day of May, must have rounded the Shetland Islands and passed southward to their stranding-places at speeds of not less than three miles per day in order to strand each twenty days after liberation. These results may therefore be taken to support the dynamically computed figures of 3·1 and 3·8 nautical miles per day as entered in Table 1.

As can be seen from Figure 50, the extension north-westwards of the Butt of Lewis-Faroe Bank section of mid-May 1950 did not completely embrace the oceanic water-mass on this far side of Faroe Bank. Oceanic volume transport north-eastward across the extension works out at approximately 1 Km³/hr. which bears the ratio of 1:2·4 to the oceanic transport through the main section between Faroe Bank and the Butt of Lewis. This ratio is nearly twice that previously derived from corresponding calculations, but is almost certainly too great since it is evident from Figure 50 that the oceanic water-mass extended substantially beyond the terminal station of the extension and was probably there trending southward as indicated by the southerly transport computed between the two terminal stations of the section (see Appendix II, p. 201).

Also accomplished towards the end of May 1950 in conjunction with the main Faroe to Shetland traverse was the short section running due north of Faroe on longitude 6°35′W to latitude 63°30′N. Figure 54b shows an apparently very irregular temperature-salinity distribution on this short section across, but again not completely containing, the entire oceanic water-mass to the north of Faroe. Indeed, by the trend of the isohalines, particularly at the northmost end of the section, in conjunction with the circumstance that the resultant direction of oceanic water movement in this part of the section was evidently westward, the dynamic result for the whole section of 3½ Km³/hr. *eastward* oceanic transport, practically the same as that passing north-eastward through the contemporary main section between Faroe and Shetland, is probably excessive as a measure of the resultant transport of the whole oceanic water-mass in this region. Maximum surface velocity at just over 3 nautical miles per day, computed, is almost exactly as on the contemporary Faroe-Shetland section.

The next section, chronologically, was that carried out by the Danish research vessel *Dana* between Faroe and Shetland on 31 May and 1 June 1950 (Figure 52), occupying almost exactly three consecutive semi-diurnal tidal periods. As suspected by Hermann from the temperature-salinity distribution (Hermann, 1951) the oceanic volume transport was a low one, the figure of 4·2 Km³/hr. comparing nearly with that of 3·4 Km³/hr. for the same section one week earlier. Maximum surface velocity on the other hand was apparently very much greater in the second week. As will be evident below, the surface velocity of the Atlantic Current almost certainly did increase considerably during the month of June 1950 along with a less pronounced increase in its intensity of which the difference between the above-cited volume transport figures may be taken as the first indication. No surface drift-bottle results are available for the period concerned to compare with the dynamically ascertained maximum velocities.

The standard pair of Faroe-Shetland Channel hydrographic sections were next completed by the Scottish research vessel *Scotia* in the latter half of June 1950 (Figures 53, 55) with the results given in Table 1. The volume transport assessments again agree reasonably closely, indicating a further accession to the strength of the Atlantic Current, and although the maximum surface velocity figures are somewhat less in agreement, an increase also in the speed of the Current is sufficiently indicated. It will be noted that the durations of both sections were definitely intermediate between complete semi-diurnal periods.

Two days after the Butt of Lewis-Faroe Bank traverse the short section due north of Viderø, Faroe, was overtaken (Figure 54c) and gave the very low resultant oceanic transport figure of only 0·3 Km³/hr. eastward through this region with a maximum surface velocity of 5·9 nautical miles per day. Reference to Figure 54c shows that at this time the oceanic water-mass north of Faroe, again but incompletely crossed by the section, was about mid-section cloven from beneath by colder and fresher water and the dynamic computations reveal that the resultant oceanic transport was in opposite directions on either side of this cleavage, that on its northern side being westward. So that the above low figure for resultant eastward transport through the section as a whole may be still somewhat excessive. In relation to the contemporary movement north-eastward through the Faroe-Shetland Channel this transport was then proportionally very considerably less than the ratio of 1:4 which has repeatedly been demonstrated by former similar computations in respect of this region.

Next in order come again the standard pair of Channel sections worked this time by *Explorer* in the third week of July and the first week of August (Figures 56, 57). In this case both sections were traversed in approximately three successive periods of 12 hours. Diminution in the intensity of the Atlantic Current from the previous month is indicated by the volume transport figures of 4·9 Km³/hr. and 3·8 Km³/hr. derived respectively from these two sections. The mean of the pair of maximum surface velocities at about 11½ miles per day also shows a slight decrease.

Some two weeks later the Faroe to Shetland section was operated once more by *Dana* (Figure 58), and by the intensity figure of 3·7 Km³/hr. combined with maximum surface velocity of 7·3 miles per day, indicated still further decline in the strength of the Atlantic Current.

Reference has been made elsewhere (Tait, 1951) to the conspicuously poor return from the surface drift-bottle liberations of 1950 in relation to those of other years in the Faroe-Shetland Channel and northern North Sea regions. It is a fact that the exceptionally poor records of northerly Norwegian coast recoveries in 1950 do not include one which, on preliminary examination apart from other contemporary records, compares in average rate of drift with the dynamic maximum velocities of Table 1 for the months of June and July 1950. Two Faroese recoveries, however, notwithstanding that the courses of the drifters concerned probably involved a partial and an almost complete circuit of the Faroe Islands group respectively, which assumptions in the circumstances are at least reasonably safe, yield minimum average daily rates of drift of 10 miles per day each centred on 29 July 1950. As will be seen from Table 1, these estimates coincide with the dynamic maximum surface velocity of the Atlantic Current through the Faroe-Shetland hydrographic section on 2-4 August 1950.

After such a relatively high speed of drift in the beginning of the month, subsiding according to the dynamic figure of Table 1 to a little over 7 miles per day in the third week of August, 1950, and presumably increasing sometime thereafter to the high figure of 12·6 miles per day at the beginning of November, it is scarcely to be expected that surface drift-bottle records should furnish evidence exemplifying this comparatively short-term variation in surface drift-speed. Nevertheless, it does so happen that two records after those cited in support of the higher surface velocities at the end of July and the beginning of August, give remarkably good evidence of the variation implied in the dynamic figures of Table 1.

A drifter liberated some 40 to 50 miles east of the Faroe Islands and recovered in northern Norway after 184 days thus yields a minimum average daily drift-speed of six nautical miles per day centred on the mid-date of its drift-period, namely 22 August 1950, over an estimated progressive route of 1100 miles; and again, from a position within 30 miles of the Butt of Lewis on 30 July 1950, another drifter, over an approximately direct route of at least 810 miles to the Norwegian coast, accomplished in 90 days, thus implies a minimum speed of surface drift as at 3 September 1950 of not less than 9 miles per day—probably more nearly 9½ miles per day. A third record, scarcely involving the Faroe-Shetland Channel proper, but sufficiently near to it in the waters west of the Outer Hebrides, in a direct passage of 125 miles through these waters between 29 August and 10 September gives therefore a velocity of about 10½ miles per day as the rate of the drift in or near the Faroe-Shetland Channel region on 4 September 1950.

In the foregoing, the eight main Faroe-Shetland Channel sections overtaken between about mid-May and just after the middle of August 1950, have been considered in pairs where applicable, that is, in three pairs and two single sections. Taking all of these individually, however, and chronologically, they appear to reveal with surprising consistency certain progressive trends in the intensity of the Atlantic Current and thus demonstrate the value of more or less regular and frequent assessment of this major oceanographical phenomenon affecting not only the immediate region of the Faroe-Shetland Channel but adjacent sea regions also of greater extent and importance from a fisheries standpoint. The transport details of the eight sections concerned along with their dates and the time intervals between them are set out in the following table.

TABLE 2

Dates of Sections ..	12-13/5		21-23/5		31/5-1/6		16-17/6		27-29/6		19-21/7		2-4/8		17-19/8
Interval between Sections (days)		10		9		16		12		22		14		15	
Volume Transport (Km^3/hr.)	2·5		3·4		4·2		6·1		5·5		4·9		3·8		3·7

Considered thus the volume transport figures clearly indicate a variation in the strength of the Atlantic Current the regularity of which is more obvious from the time curve, Figure 6. It is merely coincidental

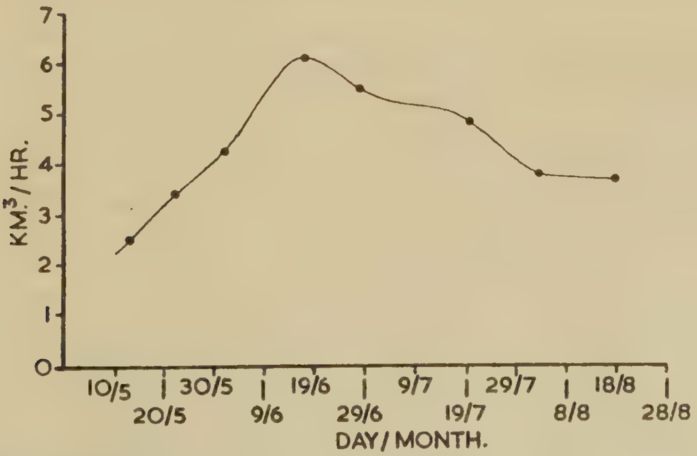

FIG. 6 Graph of Calendar Time/Volume Transport of oceanic water through the Faroe-Shetland Channel between mid-May and mid-August, 1950.

that in the actual period concerned the variation was of relatively small magnitude, very much smaller than undoubtedly does take place on occasions (as witness the difference in the oceanic volume transport figures for March and May 1950) in an even shorter period than three months. The circumstance that such minor variation can be revealed by the method of this investigation, granted a sufficiency of accurately recorded and processed observations, may be taken in some measure to testify in favour of the method itself and of the reliability of its results.

In the next three months following August 1950 a much more radical change in the Atlantic Current evidently took place, for as is shown in Table 1, the Butt of Lewis-Faroe Bank section in the first week of November 1950 (Figure 59), evidently had oceanic water passing through it at the high rate of 12·3 Km³/hr., maximum surface velocity being of the order of 12½ miles per day. This high transport figure is not without support although it cannot be corroborated by computation in respect of the companion section of the pair. Work on the Faroe to Shetland section less than one week later (Figure 60) had perforce to be abandoned on account of weather at a critical part of the section from the point of view of oceanic mass water movement, namely, with the three stations nearest to Shetland remaining to be done. The inclusion, however, of a single station north of Shetland from another, slightly later, cruise in November, 1950 shows with sufficient approximation that while probably the *gross* north-eastward translation of oceanic water through the Faroe-Shetland section was of the order of 12 Km³/hr., the *net* translation in this direction over the section as a whole, in view of contrary movement, was probably somewhat less—perhaps of the order of 9 to 10 Km³/hr. As will be evident in the part of the report dealing specifically with temperature-salinity distributions on the pair of sections (pp. 95-96) there seems adequate reason for such a difference, hydrodynamically, between them.

For the second successive year, therefore, in which observations from this pair of sections at the material time are available, unexpectedly high oceanic transport values have been obtained in respect of the autumn or early winter season, these high figures being comparable with some spring and summer values of other years, as for instance, 1929, 1938 and 1947.

1951

Again, as in 1950, three pairs of the cross-Channel sections were accomplished in 1951, the first pair in May-June (Figures 61, 62) by *Scotia*, the second in June by *Dana* (northern section, Figure 63) and *Scotia* (southern section, Figure 64) and the third pair by *Explorer* (Figures 65, 66) in July. Thereafter, the southern section was overtaken by *Scotia* in August (Figure 67) and September (Figure 68) respectively, and the northern section in October by *Scotia* (Figure 69) and in December by *Dana* (Figure 70). The short section due north of Faroe was not worked in 1951, and the north-western extension of the Butt of Lewis-Faroe Bank section was covered once only, being taken to longitude 9°18′W on latitude 62°02′N in the month of May.

In contrast with the previous year it will be observed that no early spring cross-section of the Faroe-Shetland Channel was carried out in 1951, by which indication might be given as to whether the relatively great intensity of the Atlantic Current as assessed in November 1950 continued throughout the winter. The first cross-Channel sections of May-June 1951 (Figures 61, 62), with an interval of practically two weeks between them, are far from being concordant as regards the intensity of the oceanic water movement through them (3·5 and 13·2 Km³/hr. respectively) although their maximum surface velocities at 10·2 and 8·7 miles per day do more nearly agree with each other. Turning, however, to the north-western extension of the Butt of Lewis-Faroe Bank section, this, although not as Figure 61 shows, completely embracing the oceanic water-mass north-west of Faroe Bank, and by admittedly only approximate computation on account of uncertainty as to the location of the 35‰ isohaline, yielded the relatively surprising assessment of 8·3 Km³/hr. oceanic volume transport north-eastward. Together with the assessment for the main part of the section between the Butt of Lewis and Faroe Bank, it will be observed therefore that the total north-easterly oceanic transport through the entire section aggregated practically 12 Km³/hr. which is obviously in reasonable agreement with that for the so-called contemporary northern section between Faroe and Shetland.

In fact, however (see Table 1), an interval of two weeks separated the two sections and this was probably material to the agreement which, with this fact in mind, can be explained on the basis of the current system of the region. In the first place it is to be noted that consideration of the implications of the salinity distribution on the complete section from the Butt of Lewis to beyond Faroe Bank (see Figure 61 and p. 97), supports the dynamic indication above that, on this occasion (May 1951), the main bulk of the oceanic water-mass evaded the threshold to the Faroe-Shetland Channel and passed northward on the west side of Faroe Bank. Reference now to the surface current chart constructed from the analysis of surface drift-bottle records (Tait, 1937, p. 52) shows that a branch from that part of the Atlantic Current which flows on the west side of Faroe Bank circumnavigates the northern boundary of the Bank, to re-enter the Faroe-Shetland Channel proper by the seaway between the Bank and the Faroe Islands, there to join what is normally the main Atlantic Current entering the Channel over the Wyville Thomson Ridge.

Consultation of the appropriate section of Appendix II in conjunction with Figures 1 and 61, suggests that the relatively fast-moving and massive core of the Atlantic Current north-west of Faroe Bank may, in the third week of May 1951, have been somewhat far to the north-westward to postulate its almost immediate and sharp deviation from the section eastward towards the channel between the Faroe Islands and Faroe Bank. In the interval of two weeks, however, between this section and that overtaken in the first two days of June (Figure 62), a comparatively small shift of the axis of the Current south-eastward "down the section", as it were, towards Faroe Bank, would render such a postulate reasonable, with the subsequent effect of including in the volume transport assessment for the northern section on 1-2 June that part of the oceanic water-mass which "missed" the southern section between Faroe Bank and the Butt of Lewis two weeks earlier.

With the omission of only one station on the section as normally undertaken by the Scottish research vessels, *Dana* accomplished the Faroe-Shetland section again in the early days of June 1951 (Figure 63) within one week of its performance as above by *Scotia*, and the intensity assessment for the *Dana* section at 13·5 Km^3/hr. agrees almost exactly with that (13·2 Km^3/hr.) obtained from the *Scotia* observations. Maximum surface velocities as between the two sections (16·2 and 8·7 miles per day), however, apparently differed very considerably and unfortunately no suitable drift-bottle record can be cited which compares with either.

These findings, particularly in respect of the *Dana* section, do not accord with Hermann's (1952) conclusion from the temperature-salinity distributions on the section to the effect that "the inflow [of oceanic water] into the Norwegian Sea [in June, 1951] seems to have been small".

Again with scarcely more than one week's interval, *Scotia* retraversed the Faroe Bank to Butt of Lewis section on 16-17 June (Figure 64), yielding an assessment of oceanic volume transport (14·7 Km^3/hr.) which once more corresponds nearly with the above *Dana* figure for the northern section between Faroe and Shetland, maximum surface velocity also conforming to some extent with the high value of the previous section.

It would appear therefore that in the latter half of May 1951 the Atlantic Current was in fact flowing with strong intensity, although not at first directed mainly along the Faroe-Shetland Channel. By the beginning of June, however, flowing no less strongly, the Current had apparently returned to its normal course over the Wyville Thomson Ridge and continued with high intensity in this course at least until the middle of the month. By mid-July, that is, approximately one month later, a radical regression in oceanic volume transport had evidently taken place. Despite certain deficiencies in the original observations data for the southern section (see Figure 65)*, the apparent volume transport agreement between the two sections then overtaken with an interval of about ten days between them, at about 2 to 2½ Km^3/hr., can be accepted as at least approximately correct. The maximum surface velocities on the two sections were, however, according to Table 1, widely divergent. The northern section in this case (Figure 66) because of its more adequate material, probably furnishes the more reliable assessments of both the volume transport and maximum surface velocity of the Atlantic Current in the latter half of July 1951, although it is to be noted that between another pair of stations on this section—reference to the appropriate part of Appendix II will indicate which—an appreciably higher maximum surface velocity *southward* (9·9 miles per day) apparently obtained than the maximum northerly surface velocity (6·3 miles per day) recorded in Table 1. Observations in the deeper levels of the southern section, as Figure 65 shows, and for the reason noted below, were inadequate or lacking. There is indication, however, in Figure 65, of a more or less abrupt vertical inset of colder, fresher water into the base of the oceanic water-mass to the north of the Wyville Thomson Ridge. This cold water-mass undoubtedly came from the north and was almost certainly moving southward. It may well have embraced the 550-metres reference level between the two stations concerned, thus tending to exaggerate, although probably not significantly, the oceanic volume transport assessment, but conceivably, by the nature of the calculation, having a greater effect relatively and in the same direction on the computed surface velocity. The shortest-period available drift-bottle record, with mid-date 28 July, yields a minimum speed for a direct course from the Channel to northern Norway of 5·1 miles per day, thus obviously favouring the lower of the two dynamic velocities of Table 1 as probably being nearer to the truth.

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*Because of failure of the sounding gear, extrapolation of temperature and salinity observations at depths below 500 metres at stations over and in proximity to the Wyville Thomson Ridge, and below 200 metres at the stations nearest to the edge of Faroe Bank, had to be made to complete the dynamic assessment. Such extrapolations were made with great care from the vertical temperature and salinity curves for each station and by approximate analogy also between the corresponding curves for adjacent stations, some of which curves could be taken to at least 400 metres by the original observations.

One calendar month after the July Faroe Bank to Butt of Lewis section, the same section short of the two terminal stations at Faroe Bank (Figure 67) was again overtaken with the results shown in Table 1. In all probability the figure of 2·7 Km³/hr. in respect of oceanic water-mass transport north-eastward through the section is a very little greater than would have been registered had the two terminal stations above-mentioned been included, but it is sufficiently clear that the intensity of the Atlantic Current at this time was very low, as also its maximum surface velocity. The nearest in time of a number of appropriate short-period surface drift-bottle records involving passages from the Faroe-Shetland Channel to the higher latitudes of the Norwegian coast yield minimum average drift-speeds each of 3·4 miles per day centred on the 10th and 11th days of August respectively, i.e., four to five days before the above section was traversed. Since it would appear from the previous rate of 5·1 miles per day referred to 28 July that the speed of the surface current was diminishing at the time, these low speeds of 3·4 miles per day from drift-bottle records are sufficiently near therefore to enhance the probability of the accuracy of the dynamically computed velocity of 2·4 miles per day nearly one week later.

For the fourth time in the course of the year, at again approximately one month's interval, the Butt of Lewis to Faroe Bank section was completed on 19-20 September 1951 (Figure 68), when the Atlantic Current intensity had evidently increased to 10 Km³/hr., with an increase also in maximum surface velocity to over 7 nautical miles per day.

Practically six weeks later, in the last days of October, the section from Faroe to Shetland (Figure 69) showed still further increase in oceanic volume transport to 10·8 Km³/hr. with the probability of this being a somewhat low result, maximum surface velocity having apparently almost doubled in the six weeks interval to 13·0 nautical miles per day. This velocity received support from exactly the same figure centred on 1-2 November 1951, derived from a drift-bottle which is interpreted as having circumnavigated the Faroe Island group anticyclonically from its liberation position 30-40 miles east of the group, to strand on one of the Islands after 19 days, having presumably covered the measured distance of 247 miles in that time.

Finally, omitting only one of the less important stations near Faroe on the Faroe to Shetland section (Figure 70), the Danish research vessel *Dana* took observations between 10 and 13 December 1951, which furnish the extraordinary volume transport result of 23·4 Km³/hr., with a maximum surface velocity of 13·2 miles per day, the latter almost identical with that for the same section at the end of October. No surface drift-bottle record involving the Faroe-Shetland Channel occurs nearly to confirm this figure for the period concerned, the nearest being one of a drift from a position within 30 miles north of Faroe to the northern latitudes of Norway. A direct route of 730 miles entails a minimum average daily rate of drift of only 8 miles per day, the mid-date of the drift-period being 8 December 1951. Although somewhat outwith the immediate region of investigation, however, a unique record from a starting position within 60 miles of the Norwegian coast on latitude 61°N, to recovery in a higher latitude in Norway, is probably at least approximately significant in relation to the rate of the Atlantic Current through the Channel. A fairly direct course of about 235 miles is reasonably certain in respect of the drifter concerned and this would therefore be accomplished in the drift-period of 16 days at a minimum average daily rate of 14·7 miles, with the mid-date of the interval 19 December 1951, a matter of only about one week after the *Dana* section was overtaken.

It would have been of signal value in this particular instance if corroborative assessments had been available from a contemporary Butt of Lewis to Faroe Bank section. Nevertheless, there is no reason to doubt the order of the above *Dana* result as signifying extrordinary intensity in the flow of the Atlantic Current towards the end of 1951—of an order, that is, greater than any yet revealed by these investigations, and in the season, moreover, when such great intensity might least be expected. The result, in this case, confirms Hermann's (1952) estimate of "a very strong inflow of warm Atlantic water" into the Norwegian Sea through the Faroe-Shetland Channel in December 1951.

In summary the dynamic results for the year 1951 present the important features of at least two maxima and two minima occurring in the intensity of the Atlantic Current in the Faroe-Shetland Channel. Despite the lack of definite assessments for the first four months of the year, it is highly probable in view of the figure (12·3 Km³/hr.) for the first week of November 1950 that the intensity of oceanic incursion into and through the Channel was at least fairly strong in the beginning of 1951, if indeed it did not attain a maximum, perhaps in the first month.

It seems unlikely that this high intensity of the Atlantic Current was maintained until the first available figures, namely, 12-13 Km³/hr. approximately for the third week of May and the first days of June 1951. A minimum in the intensity of the Current probably occurred in March or perhaps in April 1951. The next figures of Table 1 clearly indicate a maximum intensity during the month of June, followed by a relatively very low minimum in July-August and marked recovery in September-October, proceeding to the extraordinarily high maximum of December. The year is thus unique so far in the present research in revealing these great fluctuations in oceanic water-mass influence in the Channel within the period of a single year, and apparently not so closely related or "tied", so to speak, to the classical climatic seasons as they have hitherto been thought to be.

As to the possibility of internal wave influence on the volume transport computations of 1951, the closest agreement (within 0·5 Km³/hr.) between the three pairs of contemporary assessments, derived from two sectional traverses in July 1951, each of which was completed in approximately three semi-diurnal periods of about 12 hours. In the other two cases, referring to the two previous months, one of the pair of sections occupied a period more or less midway between complete semi-diurnal cycles. Three of the four single sections, those for August, October, and December 1951, took about 24, 36 and 21 hours respectively, but the fourth section, in September, logged 30 hours in duration, again midway between complete, successive, semi-diurnal periods.

1952

During 1952 the pair of Faroe-Shetland Channel hydrographic cross-sections was completed in the months of May (Figures 73, 74), July (Figures 77, 79) and November (Figures 80, 81). In February (Figure 71), March (Figure 72) and June (Figure 76), one section or the other was overtaken. On the last day of May and the first of June the Danish research vessel *Dana* accomplished the northern section from Faroe to Shetland (Figure 75).

The dynamic volume transport result of 11·9 Km³/hr. for the Faroe-Shetland section of 18-20 February 1952, accompanied by an apparent maximum surface velocity of 14·9 nautical miles per day, seems a relatively high assessment for the time of year. In comparison, however, with the immediately previous assessment of 23·4 Km³/hr. for about mid-December 1951, and also with the next following, namely 14·5 Km³/hr. for mid-March 1952, less than one month later, the February result as above may in fact be too low. Two sets of circumstances are perhaps relevant to the result as obtained. Firstly, the section occupied thirty hours from beginning to end, that is, a period intermediate between whole multiples of the semi-diurnal tidal period. This, in the light of Defant's (1950) remarks, may give rise to some error in the calculation, although similar circumstances on other occasions would appear scarcely if at all to have affected the result in view of the agreements registered between more or less contemporary sections, one or other of which occupied about the same period of 30 hours in its accomplishment.

Secondly, as is evident from Figure 71, temperature, salinity, and consequently density, distributions on the February 1952 section were highly peculiar, involving, in the estimation of the mean depth of the 35·00‰ isohaline between two adjacent pairs of stations, certain adjustments of the kind described for previously similar instances and graphically illustrated in Figure 5. The adjusted zero-potential depths, therefore, in these cases where the major upper water-movements across the section evidently took place, may on this account be subject to some error.

On the whole, however, it seems highly probable that the result as given in Table 1 furnishes at least a fairly true estimate of the strength of the Atlantic Current in February 1952. No suitable surface drift-bottle record is available in this instance in support of the dynamically computed maximum surface velocity of 14·9 nautical miles per day.

The dynamic result for the second week of March 1952 on the Faroe Bank to Butt of Lewis section is, as Table 1 shows, 14½ Km³/hr. This section, however, through stress of weather, had to be interrupted for just over two days in mid-section on the approach from the Butt of Lewis to the Wyville Thomson Ridge. Incidentally, it may be observed in relevance no doubt to the dynamic effect of the Ridge in inducing turbulence in the water-mass that it is most frequently at this part of the section about the Wyville Thomson Ridge that work is interrupted by weather conditions. The fact on this occasion may have influenced the final result which, therefore, like the corresponding figure for the previous month in respect of the more northerly section, may only be taken as a more or less near approximation to reality, and the same may be said of the maximum surface velocity of about nine nautical miles per day computed for the March section as compared with almost 15 miles per day for the February one. As above remarked, however, these early 1952 assessments, relatively high as they are for the season to which they refer, obviously bear a reasonable relation to the exceptionally high dynamic figure for December 1951, and to this extent enhance in their turn the probable truth of that figure.

As for the corresponding value for the previous month, no nearly contemporary surface drift-bottle record involving the Faroe-Shetland Channel occurs in support of the maximum surface velocity of 8·9 nautical miles per day computed in respect of the March section. On the other hand, two outstanding records of drift during April 1952 from the northern boundary of the North Sea, namely latitude 61°N, to higher latitudes of the Norwegian coast, and therefore almost certainly for the greater part if not the whole of their respective courses involved in the Atlantic Current almost immediately after its issue from the Faroe-Shetland Channel, furnish indirect and at least approximate corroboration of the March velocity of 8·9 miles per day.

From the intersection of longitude 4°E with the 61st parallel on 2 April 1952, one drifter, on an assumed direct course, travelled approximately 206 miles in 22 days to strand in latitude 63°40′N on the Norwegian coast, thus yielding the figure of 9·3 miles per day centred on the mid-date, namely 13 April, of the total interval involved. A second drifter from the same latitude at longitude 1°E, and set adrift on the same day, entails on a similar basis an average drift-speed of at least 6·1 miles over a direct course of about 335 miles, the mid-date of its drift-period of 55 days being 29-30 April. These two velocities, in their mutual relationship as well as in comparison with that for February (which was closely related to those for November and December 1951) and for May 1952, obviously imply an overall retardation in the superficial rate of flow of the Atlantic Current during the early months of 1952, so that the figure of 8·9 miles per day for about mid-March probably represents very nearly the state of affairs at that time.

The Butt of Lewis-Faroe Bank section of March 1952 was extended north-westwards to its intersection with latitude 62°15′N on longitude 9°30′W, and although again, as on former occasions, Figure 72 reveals that the Atlantic Ocean water-mass west of Faroe Bank, presumably proceeding resultantly northwards or north-eastwards, was not completely traversed at this ultimate position on the section, the dynamic transport assessment across the extension of the section beyond the usual terminal station on the north-east corner of Faroe Bank works out at about 5 Km³/hr. which is very nearly one third of the amount of oceanic water across the main section between the Bank and the Butt of Lewis.

The above two main cross-sections of the Faroe-Shetland Channel were traversed in the second and third weeks of May 1952 respectively, with an interval therefore of little more than one week between them. The oceanic transport results of Table 1, at between 3 and 3½ Km³/hr., obviously agree very closely and signify a very radical retraction in the intensity of the Atlantic Current in the two months interval between about mid-March and mid-May 1952. Maximum surface drift velocities over the two sections also apparently declined very markedly from about 9 to 3 and 4½ nautical miles per day, the best surface drift-bottle record in relation to these figures being one of a drift from north-west of the Butt of Lewis to Orkney in 30 days from May 10, over an assumed, almost direct route of 102 miles at a minimum average speed therefore of 3·4 miles per day centred on May 25.

The first of the above pair of sections chronologically, namely, the southern one, was somewhat irregularly accomplished insofar as the two terminal stations at the Butt of Lewis end of the section were done on two separate but consecutive days immediately before commencement at the third station of the regularly progressive traverse of the section. These terminal stations at the southern end of the section are not however vital to the resultant oceanic water transport through the section as a whole, otherwise the final transport result might have been seriously affected and agreement with the contemporary northern section much less evident. The main part of the section was accomplished very nearly within a period of twenty-four hours. The northern section, however, as Table 1 indicates, occupied a period intermediate between complete multiples of the semi-diurnal tidal period, but this fact would not appear to have affected the final result in the way which Defant (1950) postulates may occur in such circumstances.

Whether, in the event, similar circumstances may have influenced the result derived from the Faroe to Shetland section worked by the *Dana* on 31 May to 2 June 1952, the section having again taken about thirty hours in its accomplishment, cannot adequately be gauged. There was, as can be seen from Table 1, only a matter of 13 days separating this *Dana* section from the same section overtaken earlier by *Scotia*, yet the results in both oceanic volume transport and maximum surface velocity are very different, the former having apparently more than doubled in the comparatively short interval, the maximum surface velocity too showing almost an 80% increase. Nevertheless and although some three weeks elapsed before the section was again repeated, this time by *Scotia* in the beginning of the last week of June 1952, the result then obtained, namely, 6·8 Km^3/hr., affords a measure of support to the high assessment of 8·1 Km^3/hr. at the beginning of the month, especially as in addition the relative dispositions of both temperature and salinity distributions (especially of the latter) on the two occasions, argue in favour of the correct relation of the two volume transport assessments, this relation being in the opposite sense to that which from the progressive seasonal viewpoint might have been expected. The maximum surface velocities associated with the above values are more closely in agreement at 8·2 and 8·9 nautical miles per day respectively and as can be observed from Table 1 these velocities are supported by more or less closely contemporary Faroe-Shetland Channel short-period drift-bottle returns in respect of which direct routes between liberation-positions and stranding-places can be assumed.

The next dynamic result of Table 1, namely that for the Faroe Bank to Butt of Lewis section on 5-6 July 1952, is given as one of a pair which, with an interval of twelve days between the sections they represent, do not agree particularly closely. The durations of the two sections did not conform nearly to integral tidal periods. The first of the two values chronologically does, however, agree exactly with that of the single section between Faroe and Shetland taken fourteen days previously. In neither pairing are the maximum dynamic surface velocities in close accord, but it seems in view of the association of relevant minimum average surface drift-bottle velocities that there must have been some inimical circumstance, such as maldistribution of the observation stations relative to the maximum current, which affected the lowest dynamic value of less than 4½ nautical miles per day in respect of the early July section between the Butt of Lewis and Faroe Bank.

This section was worked in extension north-westward to longitude 9°30′W on latitude 62°15′N. Reference to Figure 77 gives no indication that even the bulk of that part of the Atlantic Current flowing northerly on the west side of Faroe was crossed by the section. This, together with the lack of deep observational soundings on the outermost part of the section, precludes reliable estimation of the quantity of oceanic water traversing it towards the Norwegian Sea. As the extension of the section stands, however, and with rough estimates of the probable depth of the 35·00‰ isohaline between the last two pairs of stations, the dynamic result in volume transport works out at something *of the same order* as that derived in respect of the major part of the section between the Butt of Lewis and Faroe Bank.

Now, in the same month and one week before the Faroe-Shetland section of 17-18 July, the short section due north from Viderø, Faroe, to latitude 64°N was completed, and although here again as Figure 78 reveals the oceanic water-mass lying to the north of Faroe was not completely contained within the section, there seems little doubt that the major part of it was traversed and on the same basis as before, namely, accepting the 35‰ isohaline as representing the subsurface of zero horizontal current, the volume transport of oceanic water eastward across this short section was evidently 9·2 Km^3/hr., a value which is clearly practically equivalent to that for the approximately contemporary Faroe-Shetland section. So that, on this evidence, it appears that there may be occasions on which Hermann's (1949b) argument for 1948 as to the approximate equivalence of mass oceanic incursions to the Norwegian Sea by the two routes west and east of the Faroe Islands respectively, holds, although from the present investigation this cannot be conceded as of general occurrence.

Circumstances connected with the operation of the southern section of the pair worked during November 1952 might almost suggest that the oceanic volume transport agreement recorded in Table 1 in respect of the two sections is fortuitous. Stress of weather not only entailed the abandonment of the southern section short of two stations at the Faroe Bank end, but necessitated also an interruption of nearly four days after five stations had been completed from the Butt of Lewis. The fifth station was repeated at the resumption of operations and for the dynamic computations the means of the observations at the successive levels from surface to bottom at the repeated station were adopted. This entailed, however, almost negligible adjustments to the salinity observations (0‰ to ±0·02‰), and only small (±0·05° to ±0·25°C) changes to temperature observations. It is not improbable that had the two final stations of the section to Faroe Bank been completed the oceanic volume transport agreement of Table 1 might have been even closer, since the resultant transport immediately south-eastward of Faroe Bank is on the whole rather more frequently in a southerly than in a northerly direction, and only of very small magnitude.

On the whole, therefore, the agreement in volume transport between these two sections of November 1952, with an interval of about ten days between them, may be accepted with reasonable confidence and the order of that agreement at approximately 10½-11 Km^3/hr. taken as indicative once more of an autumnal resurgence in the intensity of the Atlantic Current after a minimum summer intensity which, however, was evidently not so low as in the previous year. The nearest appropriate, minimum-period, surface drift-bottle return bearing relation to the maximum surface velocities on the two sections was one which furnishes an average rate of drift of 6·7 nautical miles per day centred on a date rather more than a month after termination of the second section. In point of fact the drifter concerned commenced its course at one of the stations on the northern section of November 1952, and in the period of 71 days to its recovery on the Norwegian coast on about latitude 65°N, is assumed as usual for the purposes of these calculations to have overtaken an approximately direct route between liberation position and stranding-place.

Thus, for at least the fourth successive year, when observational material for autumn-winter months has become available, these dynamic investigations reveal in 1952 a very marked strengthening of the Atlantic Current in the Faroe-Shetland Channel to a more or less high maximum within these months.

Summary Recapitulation and Theses

It seems scarcely necessary to repeat the thesis which was advanced on the results of the dynamic investigation of the nine contemporary pairs of cross-sections of the Channel which were accomplished between the years 1927 and 1939 inclusive. Twelve of the thirteen similarly paired cross-sections worked between 1946 and 1952—the thirteenth apparently aberrant case being susceptible on evidence of rational explanation—amply confirm by their results that sufficiently systematic and intensive observation of temperature and salinity on these sections provides the material for reliable quantitative assessment of the intensity and volume of the oceanic water-mass in this corridor to more northerly and easterly, economically important, sea regions.

Reference is here appropriate to Defant's (1950) thesis that, because of the possible influence of internal waves on temperature and salinity distributions in cross-section, dynamic computations based on these distributions may be illusory if practical steps are not taken to compensate the influence. As regards the Faroe-Shetland Channel, the evidence for this thesis from these investigations would seem to be slender, if, as may be supposed, such effects as Defant indicates will be more or less compensated from one end of a section to the other should the section be overtaken in a complete multiple of the semi-diurnal, or diurnal, tidal period to which the vertical displacement of water-masses by internal wave movement is deemed also to be subject (Helland-Hansen and Nansen, 1926; Sverdrup, Johnson and Fleming, 1942, p. 592).

In Table 1, columns 9 and 10, there are ten cases of agreement between paired section volume transport assessments in which the difference between the values is less than 0·5 Km³/hr. In only three (possibly four) of these cases, by the figures of columns 4 and 5, were both sections of the pair traversed within ±3 hours of 12*n* hours, *n* being an integer. In the remaining seven (or six) cases, one of the sections was overtaken within this prescribed variance from 12*n* hours, but the other, in four instances, occupied 12*n*±5 to 12*n*±6 hours which, on the assumption made, should tend towards maximum discrepancy.

Again, in six cases of volume transport agreement showing differences of 0·6 to 1·0 Km³/hr., no pair of sections together was accomplished within 12*n*±3 hours. In five cases one of the sections was completed within this interval, but in the sixth case both sections were five hours distant, the one positively and the other negatively, from 12*n* hours.

At the other end of the scale, so to speak, a volume transport difference greater than 3 Km³/hr. occurred only once—except in the completely aberrant case—and, in this instance, while in the interruption of operations on one section there was another possible contributory cause of the difference, the actual times occupied on each section were within 12*n*±3 hours; and in two cases of only fair to good agreement (1·1 to 2·0 Km³/hr. difference in volume transports), the periods of all four sections were within 12*n*±3 hours.

So that, on the whole, Defant's thesis would not seem to have significant application in the Faroe-Shetland Channel region. The agreements recorded in Table 1 between contemporary volume transport assessments are such as to justify the statement that, at all events in concordant pairs, these are quantitatively reliable measures of the intensity of the Atlantic Current through the Faroe-Shetland Channel.

In addition to the thirteen pairs of sections, nineteen single, post-war, cross-sections were also dynamically assessed in this second epoch of these investigations, making a total of sixty-nine sections so treated to date.

The range of variation in volume transport figures between 1946 and 1952 was considerably greater than between 1927 and 1939, namely, from a minimum of 2·0-2·6 Km³/hr.—slightly greater than the minimum (*ca* 1·5 Km³/hr.) of the earlier epoch—to the very high maximum of over 23 Km³/hr. This maximum was, surprisingly, a midwinter value—December 1951. The next in order of magnitude, namely, almost 20 Km³/hr., was a midsummer result recorded within about one month of the minimum value above and pertaining to the year 1947. This year, too, it may be noted merely in passing, was outstanding also meteorologically or climatically over a great part of the European continent. There follows a group of eight magnitudes, from over 13 to nearly 16 Km³/hr., which may be regarded as of approximately the same order as the maximum oceanic volume transport of the earlier period, namely, about 14 Km³/hr.

The very even distribution of the total number of sixty-nine transport assessments over the major part of the complete range, as computed, namely, from 1·4 to 23·4 Km³/hr., is indicated by the circumstances that the mean and median values of 8·2 and 7·0 Km³/hr. respectively lie so close together, the first and third quartile magnitudes being about 4·2 and 12·1 Km³/hr. respectively.

The maximum computed surface velocities on the paired sections of the 1946-1952 period agree on the whole tolerably well with each other, as in the earlier group of years. The total range of these velocities, however, including those of the single sections, was somewhat less in the second than in the first period, but again it is noteworthy as implying correlation between these two independent means of assessing surface current speeds, that where the appropriate and particular surface drift-bottle records exist, so many of these yield minimum average rates which are closely related to and frequently more or less identical with the corresponding, computed magnitudes.

The volume transport assessments of Table 1 are usefully recast in the form of Table 3 which facilitates comparison between the different years and seasons. In this table, single section values are asterisked, the unasterisked magnitudes being the means of paired section transports.

TABLE 3

Oceanic Volume Transport through the Faroe-Shetland Channel.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
						Km^3/hr.						
1927 ..	..	..	..	..	..	..	..	1·5	..	..	..	..
1929 ..	..	..	..	..	13·6	13·3*	..	..	..	..	..	..
1931 ..	..	..	..	..	2·4	..	..	..	..	..	..	..
1933 ..	..	..	..	..	..	3·3	..	..	..	..	..	..
1934 ..	..	..	..	4·8*	4·4*		3·1*	..	..	..	..	..
1935 ..	..	..	..	..	..	5·6	..	..	..	..	..	..
1936 ..	..	..	..	..	..	3·9	..	..	..	..	..	..
1937 ..	..	..	..	..	8·8	..	..	..	..	..	..	..
1938 ..	..	..	..	..	9·3*	11·2						
1939 ..	..	..	..	..	..	8·3	10·4*	..	..	..	..	..
1946 ..	..	..	..	..	..	..	..	5·0*	..	..	..	..
1947 ..	..	..	..	..	..	19·6	15·8*	..	..	..	..	..
1948 ..	..	..	..	..	6·1	8·9*	..	4·7*	..	..	..	..
1949 ..	..	..	7·3*	5·2*		..	11·5*	..	11·2	..	14·1	..
1950 ..	..	..	15·7*	..	3·0 4·2*	5·8	4·4	3·7*	..	..	12·3*	..
1951 ..	..	..	..	..	3·5*	13·8	2·3	2·7*	10·0*	10·8*	..	23·4*
1952 ..	..	11·9*	14·5*	..	3·3	7·5	8·3	..	..	..	10·8	..

*Single Section Results.

The succession of low summer, or spring-summer, oceanic transports from 1931 to 1936 inclusive is at once apparent. The figure of 9·3 Km³/hr. for May 1938 probably anticipates the subsequent increase to 11·2 Km³/hr. six weeks later. The asessments of June and July 1939 would appear to be similarly related, representing, within the short intervals involved, an increase in the intensity of the Atlantic Current of not less than twenty per cent.

Assessments for the years 1949 onwards, when autumn-winter values became available, reveal conditions which, although hitherto perhaps occasionally suspected on empirical circumstantial evidence, are here for the first time given quantitative expression. In each of the four years concerned the oceanic volume transports through the Faroe-Shetland Channel in the autumn-winter seasons were evidently of considerably greater magnitudes than the preceding spring-summer incursions. It is material also that the years were consecutive, for, from the standpoint of long-term fluctuation, it would almost appear from the values of Table 3 that the successive autumnal accessions to the intensity of the oceanic influence in the Channel themselves increased annually to the high maximum of December 1951. It can be taken as practically certain that the phenomenon of greater autumn-winter than spring-summer oceanic transports is not invariably an annual occurrence. The combination of circumstantial with the factual evidence of Table 3, and such assessments as are available for earlier years (Helland-Hansen, 1905, and Robertson, 1905, 1907, 1909a, 1909b, 1913), suggest that this oceanographic feature, like that of the succession of low summer transports between 1931 and 1936 inclusive, occurs in groups of years, and recurs only at more or less long-term intervals of the order each of at least several years. Qualitative evidence in support of the suggestion is contained in other aspects of this investigation which are discussed in the subsequent part of this report.

Consideration in detail of the relationships among the 1949 to 1952 values of Table 3 effectively illustrates something of the scale of the phenomenon they represent. Between about the end of April and the end of July 1949, for instance, an increase in oceanic water-mass transport of the order of 120 per cent is indicated, that is, an average increase of 40 per cent per month, and this increase, presumably maintained throughout the month of August, advanced apparently by a further 26 per cent in the two months from September to November 1949.

In the following year a decrease of 80 per cent is implicit in the transports recorded in March and May respectively. In the autumn of 1950, the increase in the intensity of the Atlantic Current in the Channel between August and November would appear to have been of the order of about 77 per cent per month.

Evidently the year 1951 was a year of still greater fluctuations. Within the short interval of one month between about mid-June and mid-July, for instance, the oceanic water-mass declined in intensity by over 83 per cent, only to wax again by 270 per cent between August and September and by a further 58 per cent per month from October to December.

Similar but smaller fluctuations as in 1950, that is, a spring decline and an autumnal increase, are denoted by the magnitudes for 1952.

In Figure 7 the volume transport magnitudes of Table 1 for the four years 1949 to 1952 are individually plotted in chronological order* and, except for the summer-autumn period of 1952 when a considerable gap in the observations occurred, joined up by continuous smooth curves. Assessments from the observations made by the Danish research vessel *Dana* are designated by the letter D.

While in the four years concerned the oceanic water-mass incursion into the Channel never apparently reached such a low intensity as in August 1927, the curve for 1951 indicates at least a near approach to that minimum about the end of the month of July.

At the other extreme, the extraordinarily high maximum of December 1951 surpasses anything yet revealed by these or similar computations in respect of the North-Eastern Atlantic Ocean, or the seas contingent thereon. One has to look to the western Atlantic Ocean, to work on Gulf Stream waters proper, for superior measurements to that accruing from the *Dana* observations of December 1951 in the Faroe-Shetland Channel. Such assessments, however, as are instanced by Stommel (1950) from the work of Iselin (1940) and of Munk (1950), are so greatly in excess of the above maximum volume transport value as to imply that at all events this value for a phenomenon which is in all likelihood (although perhaps distantly) related to that to which Iselin and Munk refer, is at least within the bounds of probability. And as previously pointed out, the relatively high assessments of February and March 1952, together with an independently derived high velocity from a more or less unique surface drift-bottle record embracing the period, if not the immediate region, of the December 1951 traverse of the Channel, support the high maximum oceanic transport recorded for that month.

The curve for 1951, then, on Figure 7, shows the greatest amplitude of variation of the four curves given there. Assuming that an actual and very high winter maximum occurred within the calendar year, this was at least the second such maximum to occur within twelve months, the previous one, also a high value of nearly 15 Km^3/hr. occurring six months previously, in June 1951. The 1951 curve begins, however, only in the latter half of the month of May, in recovery, it may safely be inferred, from a minimum in oceanic transport. By analogy with the appropriate parts of the remaining three curves, which in these parts are of more or less similar significance as regards the phase of Atlantic Current intensity represented, the decline in intensity prior to May 1951 was probably correspondingly steep, from a maximum—having regard to the final part of the 1950 curve—which may have fallen within the calendar year of 1951. Thus there is presented the possibility of three maxima and two minima in oceanic water transport within a single year.

Of the other three curves, that for 1949 suggests the occurence of two minima and probably also two maxima. The year 1950 *may* have registered a maximum in the beginning of the year, did apparently have a very modest maximum about mid-June after a low minimum in May, and may again, after a second more or less indefinite minimum towards the middle of August, have registered its second (or third) maximum late in the year. This last, however, as already indicated, may equally have fallen in the beginning of 1951.

The 1952 curve, although incomplete, again suggests three maxima, only two of which are actually illustrated. The missing part of the 1952 curve was probably roughly similar to the corresponding portion of the 1949 curve, both parts being in opposite phase to the curves of 1950 and 1951 in approximately the same season of the year.

As before mentioned, the dynamic evidence for the autumn-winter months of the years 1949 to 1952 indicates more or less strongly increasing intensity of the Atlantic Current in the Faroe-Shetland Channel in each of these four corresponding seasons. In addition, surface drift-bottle records indicate similar

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*Since it would be unrealistic to include the value 3·5 Km^3/hr. against the date 19 May 1951, the magnitude of 12 Km^3/hr. representing the extended section in this case, has been plotted.

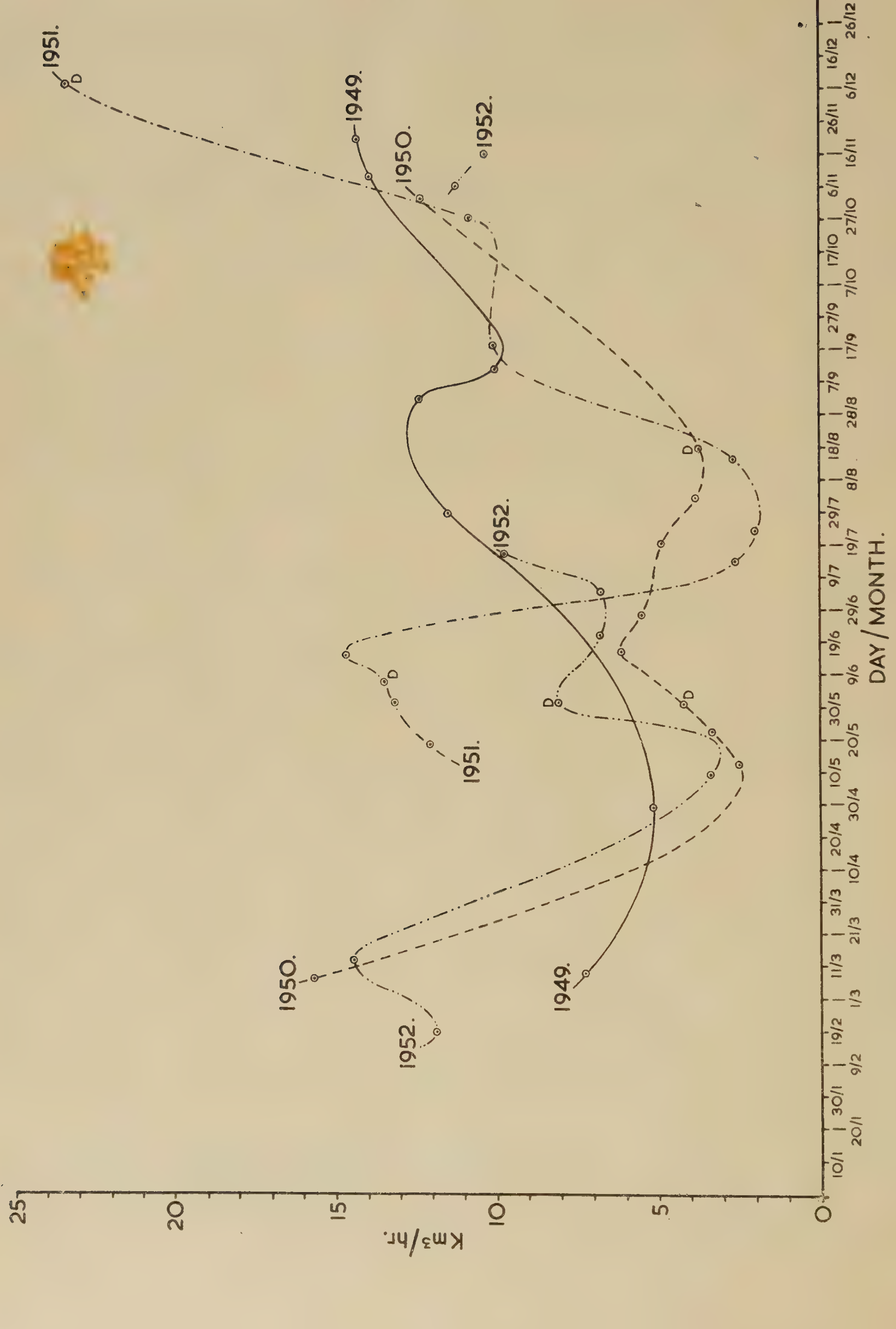

Fig. 7 Graphical illustration of fluctuations in the intensity of the Atlantic Current in the Faroe-Shetland Channel during the years 1949 to 1952 inclusive.

autumnal increases in the strength of the Atlantic Current in 1947 and also in 1948. In strict chronological sequence, as they are entered on Figure 7, the two final assessments of 1952, both in November with, effectively, scarcely more than one week between them, might suggest that the oceanic water-mass was in fact slowly declining in intensity during this month. This evidence, however, is so obviously within the limits of computational error as to be practically negligible. Increasing intensity during the autumn of 1952, and thus for at least the fourth successive year in this season, is almost certainly the true indication of all relevant circumstances in the foregoing and subsequent parts of this report. Investigation must continue for a longer period, however, before this can be cited as a phenomenon of general annual occurence. As in other respects already referred to, there is the possibility also in this connection that the phenomenon is but a part of a long-term variation involving a number of years and not necessarily cyclic in its occurrence. Only systematically sustained investigation can elucidate these questions. The results of the present investigation with these possibilities and indeed the actual variations demonstrated, in mind, expose the probability of inherent error in attempts to derive general laws by averaging or integrating results or observations in monthly, seasonal, or other such periods, over a limited number of years. For the present and, it would appear, for some considerable time to come, the oceanographical character of seas of fishery import must be studied each year on its own merits so to speak. This, in turn, necessitates systematic observation with sufficient intensity and frequency to yield the desired picture in requisite detail and sequence, in order that practical correlation, where such may exist, between physical oceanographical and biological phenomena, may be demonstrated. Moreover, apart from long-term fluctuations, some of the short-period variations illustrated by Figure 7 are clearly of such great magnitude as, translated into terms of oceanic physical or chemical characteristics of import biologically to fisheries, imply enormous and comparatively rapid environmental changes. These, almost of necessity it would seem, must influence in greater rather than less degree the lives and life processes of commercially valuable species in the sea regions affected. Again, only systematic routine observation can clarify these issues. It is meantime valuable and appropriate in conjunction with the foregoing dynamic study, to investigate the temperature and salinity distributions themselves on these cross-Channel sections and others involved in the study, and from these to define and consider empirically the several water-masses to be encountered, either constantly or only sporadically, in the Faroe-Shetland Channel region.

Before passing, however, to this aspect of Faroe-Shetland Channel hydrography, the dynamic evidence of the foregoing investigation relative to the subsidiary oceanic water-mass incursion into the southern Norwegian Sea by way of the west of the Faroe Islands may here be summarily reviewed. On no fewer than four occasions in 1949, in the months of March, May, July and September, and again in March 1950, the northward oceanic progression by this route was found to be approximately one quarter of the magnitude of that coursing through the Faroe-Shetland Channel and it is noteworthy that this ratio held for main Channel oceanic progressions ranging from just over 5 to nearly 16 Km³/hr.

Somewhat inconclusive assessments for the mid-month of May 1950 to the west of Faroe, and in the last days of the month to the north of these Islands, gave values (probably more or less excessive) which in one case approached one half of, and in the other indicated equality with, the contemporary through-Channel oceanic transports of 2½ and 3½ Km³/hr. respectively. In the following month, on the other hand, the resultant eastward movement of oceanic water to the north of Faroe seemed scarcely to be one-twentieth of the bulk of the through-Channel flow which was assessed at 5½ Km³/hr.

In 1951, when only one measure of the Atlantic Current was made outwith the Faroe-Shetland Channel, this, in the month of May, to the north-west of Faroe Bank, was estimated to have approximately twice the intensity of that part of the Current flowing into the Faroe-Shetland Channel proper between Faroe Bank and the Butt of Lewis.

In March 1952, the approximate ratio of 1:3 is computed as having obtained between the oceanic transports north-west of Faroe Bank and between Faroe Bank and the Butt of Lewis respectively, the latter magnitude being of the order of 14½ Km³/hr., while in the month of July 1952 the subsidiary oceanic incursion into the Norwegian Sea by way of the west of the Faroe Islands was calculated to be nearly the same as the resultant eastward trend of the oceanic water-mass to the north of these islands, namely between about 8 and 9 Km³/hr., both measures indicating at least equality with the contemporary north-eastward movement of between about 7 and 10 Km³/hr. through the Channel proper.

In concluding this part of the report, it should perhaps be mentioned that only that which is considered to be more or less essential to its immediate purposes has been included. Sectional diagrams of the δ distribution, for instance, although necessary to the calculation of volume transport for particular parts of sections involving the application of the Helland-Hansen (1934) concept, have not been reproduced. The material of Appendix II affords the opportunity for such reconstructions where they may be desired. Discussion of the numerous instances of vertical density inversion which are implicitly accepted in a number of the dynamic computations has also been left over for treatment in a separate paper.

PART TWO

THE WATER MASSES OF THE FAROE-SHETLAND CHANNEL

The two main and, as hitherto believed, constant, water-masses of the Faroe-Shetland Channel region are the oceanic and the bottom Norwegian Sea water-masses. The former is a thick uppermost layer of relatively warm and salt water flowing approximately north-eastward into the Norwegian Sea, and is superimposed upon a cold, fresher, bottom layer originating from the deeps of the Norwegian Sea. The latter may be in greater or less admixture with water of Arctic origin stemming from the East Icelandic Arctic Current, and trends at a relatively slow rate southward along the Channel until impeded by the barrier of the Wyville Thomson Ridge. The demonstration, by Robinson (1952), of a narrow deep channel sounding more than 450 fathoms, between Faroe Bank and the shelf which bears the Faroe Islands (Figure 1a), carries with it the implication, and to this extent supports Nansen's (1912) postulate, that by this deep channel some of the bottom Norwegian Sea water from the Faroe-Shetland Channel may pass into the North-Eastern Atlantic Ocean. Specific evidence of the implication is indeed furnished by the work now to be described. It seems doubtful, however, if this drain-off from the deep Faroe-Shetland Channel could constitute a very material contribution to the deep waters of the North-Eastern Atlantic Ocean basin.

The apparently necessary inclusion for dynamic purposes of many original observations of temperature and salinity which would formerly have been considered sufficiently aberrant to justify their rejection as reliable data, has prompted the following research into the temperature and salinity distributions in cross-section in the Faroe-Shetland Channel. In the outcome, this is somewhat analogous to Cooper's (1952) findings in regard to the continental slope waters of the Celtic Sea from a comprehensive investigation of the physical and chemical oceanography of that region; for the new investigation in detail of the Faroe-Shetland Channel region has revealed, among a number of interesting and sometimes surprising features, the presence on occasions of other originally and specifically different water-masses, either within or sometimes totally distinct in mass from the two main types of the oceanic and the bottom Norwegian Sea waters.

Sectional Distributions of Temperature and Salinity, 1927-1939

In the construction of the numerous sectional diagrams of temperature and salinity distributions which are the basis of this second part of the present investigation, a method has been adopted which, in the writer's opinion, results in the most effective illustration of these distributions, besides giving useful indication in many instances of the water-movements affecting them. On the basis of strict rectilinear interpolation, horizontally and vertically, isotherms have been constructed for each degree Centigrade—occasionally, for more adequate illustration, a half-degree isotherm is entered—and isohalines for each 0·05‰ interval.

The data from which these sectional diagrams are constructed are for the most part given in Appendix II. This, however, includes only those observations which were necessary to the computations of oceanic water-mass transport, that is, to a depth in each case just below either the mean summit level of the Wyville Thomson Ridge, namely 550 metres, or the depth of the 35·00‰ isohaline. The full data are published in the appropriate annual *Bulletin Hydrographique* of the International Council for the Exploration of the Sea, except that, for some few years when corrections on account of error in depth registration have had to be made according to unprotected reversing thermometer registrations, these corrections were not applied before publication. The reason for this was uncertainty at the time as to the accuracy of some of the corrections indicated. This uncertainty has been removed only as a result of the foregoing dynamic investigation. In most cases, however, the ensuing diagrams contain sufficient indication, or specification, of the deeper observational data not included in Appendix II, but used in the following investigation.

The black dots on each sectional diagram denote the levels at which actual observations were taken. Interpolated data are not indicated.

1927

As remarked elsewhere, 1927 was the first year in which a pair of hydrographic sections some distance apart, but more or less closely following each other in time, was laid across the Atlantic Current in the Faroe-Shetland Channel, one section spanning the Current as it enters the Channel over its threshold, the Wyville Thomson Ridge, and the other, in 1927, laid between Fair Isle and a position some thirteen miles south of the Island of Syderø, Faroe. As will be seen in the following, the latter section was later, in successive stages, laid farther north, so as to traverse the Current more nearly as it is about to leave the Channel and pass into the wider waters of the Norwegian Sea.

The sections are each discussed separately.

Syderø, Faroe (APPROX.)—**Fair Isle.** 7-9 August 1927. Figure 8.

A feature of note on these sectional temperature and salinity distribution diagrams is the core of the Atlantic Current as defined by the curve, or curves, of a particular isohaline, which normally encloses a maximum nuclear salinity. Not all of these diagrams illustrate such a well-defined core as that which is completely bounded by the 35·40‰ isohaline on Figure 8. Its nuclear salinity was 35·45‰ between about 50 and over 100 metres depth. In August 1927 this core neither broke surface, which, as will become evident, is on the whole the normal occurrence, nor reached quite to the bottom in its position immediately over the continental edge.

Rapid diminution of salinity above, to 35·32‰ at the surface, and to either side of, the Atlantic Current core, to below 35·20‰ at adjacent stations, is indicative of freshening influences. That to the south-eastward towards Fair Isle probably derived from the convergence of west Scottish coast waters with the Atlantic Current (see Surface Current Chart, Tait, 1937, p. 53), while north-westward towards Faroe the occurrence of minimum nuclear salinity of 35·17‰ between 10 and 30 metres depth at the next adjacent station to the high salinity Atlantic core, may be evidence of an unusual extension south-eastward from the Faroe Islands of that East Icelandic Arctic Current influence which normally reduces the salinity of the oceanic waters circulating anti-cyclonically round the group. On the other hand, the disposition of the isohalines in the uppermost waters of the section between Faroe and the Atlantic Current indicates rather that the minimum nuclear salinity above-mentioned was significant of a separate influence from the same source streaming southward into the Faroe-Shetland Channel approximately midway between Syderø and Fair Isle, an inference which is supported by the dynamic computation of volume transport through the section (see Appendix II).

Downward from the core of the Atlantic Current it is usual, as in Figure 8, to find the successive isohalines to that of 35·00‰ more closely approaching each other and thereafter tending to space out again. This, in fact, as before acknowledged, was one of the conditions leading to the assumption of the 35·00‰ isohaline as representative in cross-section of the level of zero horizontal potential in the northern part of the Channel. The situation here of the 35·00‰ isohaline, at approximately 400 metres in August 1927, appears on the whole to be normal, but in this diagram is the first indication in these investigations of a feature in relation to the bottom waters of the Channel which subsequently became much more marked and persistent over a period of years. By no less than six observations between 500 and 1115 metres, evidence is implicit in salinities of 34·85‰ to 34·88‰, of the presence in considerable bulk of a water-mass which, according to Helland-Hansen and Nansen (1909), is not to be ascribed in origin to the bottom waters of the Norwegian Sea. By the same authorities (pp. 292 *et seq.*), and taking into consideration also the associated temperatures, 1·25°C to —0·81°C, of August 1927, such salinities as were then found at practically all levels from 500 metres downwards to over 1100 metres, would appear to signify substantial influx into the Channel of that intermediate "tongue" of Arctic water emanating from the underside of the East Icelandic Arctic Current and found at all times along the slope of the submarine ridge between Faroe and Iceland.

In consideration of the temperatures of the August 1927 section, it is not unusual to find the maximum temperature on this northern section, or on those which later correspond to it, outwith the core of the Atlantic Current. In the present instance, maximum temperature of 13·52°C was recorded at the surface at the neighbouring station south-eastward to that about which the Atlantic Current core was situated. In the uppermost 50 metres of the greater part of the section temperature declined rapidly from 13·5°C to 9°C, but, as is again a regular feature of this region, the 9°C isotherm dropped steeply to about 250 metres on the continental slope. The mass of the water between about 100 and nearly 300 metres, except in near proximity to the continental slope, had a temperature of between 7°C and 8°C, but thereafter to about 475 metres the fall in temperature was again relatively rapid, the 4°C isotherm almost coinciding with the 35·00‰ isohaline. Below 2°C, temperature diminution was again somewhat slower, with zero registered at about 640 metres. Reference has already been made to the sub-zero temperatures of the bottom waters of the Channel with the specification of the minimum temperature of —0·81°C recorded at just over 1100 metres.

Faroe Bank—Butt of Lewis. 18-20 August 1927. Figure 9.

As on its northern counterpart overtaken about ten days earlier, the same isohaline of 35·40‰, about a slightly lesser maximum nuclear salinity of 35·42‰, defined the core of the Atlantic Current on this more or less contemporary southern section of August 1927. Like the more northerly core also, the southern one likewise did not break surface in the region between the Wyville Thomson Ridge and Faroe Bank. Freshening influences, probably from the same source as farther north, here intervened in the uppermost 50-metre layer. Similar influence of a more marked character, due doubtless to west Scottish coast waters, is evident also from Figure 9 on the Butt of Lewis end of the southern section.

On the south side of the Wyville Thomson Ridge salinity diminished to 35·17‰ at about 1000 metres depth. This, as will become evident, is not generally the condition here encountered. On the north side of the Ridge, below its summit level, sub-oceanic-salinity water was recorded with only a single observation less than 34·90‰ (34·89‰) to indicate that the normal bottom Norwegian Sea water present included also some Arctic water from the East Icelandic Arctic Current which was such a marked feature of the northern section (Figure 8).

The concentration of the isohalines (and isotherms) between the Wyville Thomson Ridge and Faroe Bank at about the level of the summit of the former, as also the shape of the 35·35‰ isohaline, is indicative of the effect of the physical impediment of the Ridge on the oncoming oceanic water-mass, only the uppermost 300 fathoms or 550 metres approximately of which can proceed farther northwards. Isolated maximum and minimum nuclear salinities in the vertical column plumbed by the deepest station of the section suggest also a probable effect of the Ridge in inducing turbulence in the waters about it.

Maximum temperature on the southern section, at just over 14°C, was thus about 0·5°C in excess of the maximum on the northern section, and as in that instance, was recorded on the surface beyond the Atlantic water core. A correspondingly rapid decline in temperature to 10°C was registered in the topmost 100-metre layer approximately of the southern section. For lack of a station vertically over the continental slope, however, it cannot be gauged whether the 9°C isotherm, lying between approximately 200 and 250 metres along the greater part of the southern section from Faroe Bank, dropped to greater depths on approaching the slope.

The relatively low salinity of 35·17‰ recorded at over 1000 metres on the south side of the Wyville Thomson Ridge was matched by a correspondingly low temperature of 6·24°C. It is seldom that in this situation the temperature falls even to 7°C. In similar although slightly lesser depths on the north side of the Ridge, the minimum registered temperature was —0·66°C, appreciable higher than the minimum temperature of the deep channel farther north.

1929

Syderø, Faroe—Papa Stour, Shetland. 17-18 May 1929. Figure 10.

As in August 1927, the core of the Atlantic Current in May 1929 on a section between Faroe and west Shetland was represented by water of salinity exceeding 35·40‰, the maximum nuclear salinity of 35·42‰ corresponding exactly with that of the southern section in the former year. This core, in May 1929, was evidently more restricted than before, but in the later period extended from the sea surface to the bottom at the same position on the section, namely, directly over the continental edge. On the other hand, fresher water influence near Shetland was scarcely at all in evidence in May 1929 as compared with conditions west of Fair Isle in August 1927, and similarly, the diminution in salinity in the upper waters of the section north-westward towards Faroe, even near to Faroe, indicates only very little freshening influence compared with the corresponding region approximately two years before.

The common feature of concentration of superior isohalines towards that of 35·00‰, which represents the base of the oceanic water-mass, is again illustrated in Figure 10. This diagram, however, shows the arresting phenomenon of these isohalines dropping more or less vertically to great depths on the continental slope, the 35·00‰ isohaline apparently terminating at about 750 metres. The strong vertical vortex which it would appear was the cause of this unique disposition of isohalines, and which is indicated by the curves of specific volume anomaly shown in Figure 10a, was probably only of a relatively temporary nature, but none the less it illustrates the complexity of conditions which can obtain in a region of such rugged bottom topography as the Faroe-Shetland Channel.

The bottom waters of this May 1929 section, below about 500 metres over most of the section, by their salinity of 34·88‰ to 34·89‰, were evidently of the Arctic type, bottom Norwegian Sea water being sandwiched between this Arctic water-mass and the oceanic water-mass.

On this occasion, maximum temperature on the section, at 9·59°C, was recorded superficially within the Atlantic Current core, the temperature of which lay almost within the bracket of 9°C to 9·5°C. Vertical diminution of temperature in the upper water layers was not so rapid in May 1929 as was noted in August 1927, but a similar concentration of isotherms towards the 35·00‰ isohaline approximately is again shown in Figure 10.

The temperature of the water column in the Faroe neighbourhood was about 7·5°C and fairly uniform. Minimum temperature of the bottom, Arctic water-mass, namely —0·91°C, was registered at 500 metres depth near its upper surface immediately below the above-indicated vortex.

But for the fact that no fewer than eleven other similarly puzzling combinations of low temperature with high salinity observations occurred later in this investigation in respect of levels below 550 metres, such a combination as that recorded on the western slope of the Channel proper on the section under scrutiny, would almost certainly have been regarded as fictitious.* Along with others it was in fact discounted in the beginning of this detailed research into temperature and salinity distributions in the Faroe-Shetland Channel region, until, in review, the comparative frequency of these peculiar observations attracted particular attention and prompted further scrutiny, with the results hereinafter detailed.

The first of these apparently 'impossible' combinations in this study occurred on the above section at the 600 metres level, that is, near the bottom, midway on the south-eastern slope of the Faroe Islands shelf. The observations there recorded on 17 May 1929 were —0·30°C in conjunction with salinity of 35·29‰, giving thus a density (σ_t) of 28·38.From the salinity alone it seems obvious from Figure 10 that a small body of oceanic water, "caught" as it were by the observations at 600 metres depth, is about to be separated from the parent oceanic water-mass by upthrust of Arctic water towards the slope of the Faroe shelf through the thin intervening layer of bottom Norwegian Sea water. In its descent down the slope, with its salinity for some reason relatively unchanged, it has evidently become rapidly cooled and finally, at observation level, super-cooled by contiguity of the Arctic water-mass. Temperature at the same level within the latter, scarcely four miles distant at its boundary from the 'slipped' oceanic water, was —0·34°C, but at the same time the descending oceanic water was probably also and more quickly cooled from below, where undoubtedly it was in much closer proximity to, if not perhaps in juxtaposition with, the Arctic water-mass. In any event, its high density would not allow the small body of oceanic water to remain long in its observed position, and this consideration, in conjuction with Figure 10 which so clearly demonstrates the probable mode of formation of such isolated small bodies of water, goes far towards explaining the occurrence of similar patches, in, as will be seen, more unlikely, but now perhaps understandable, positions.

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*Additionally, as was noted on p. 19, a similar apparently anomalous temperature/salinity combination occured at 300 metres depth on this same section of May 1929.

In view of statements which have formerly appeared regarding similar values, further reference should be made here to the high density above entailed of σ_t=28·38. Helland-Hansen and Nansen (1909, p. 85), referring to certain high sea densities cited by Mohn (1887), σ_t densities between 27·95 and 28·40, say "no such variation can possibly exist anywhere in the Ocean in deeper strata." They add in a footnote, "The only region where sea-water with densities approaching this value (28·40) has been observed, is the Barents Sea, where an exceptionally heavy bottom-water (σ_t=28·33) has been observed; but this high density is produced by the formation of ice under peculiar local circumstances (cf. Nansen, 1906, p. 40, and pp. 30-34) which cannot occur to the same extent in the open Ocean." It seems that in the light of the above circumstances pertaining to the Faroe-Shetland section of about mid-May 1929, and in that of other similar instances cited as they arise in the sequel, such statements now call for revision.

Faroe Bank—Butt of Lewis. 28-29 May 1929. Figure 11.

The Atlantic Current core on this section, traversed eleven days after that between Faroe and Shetland, was defined by the isohaline of 35·45‰, enclosing maximum nuclear salinity of 35·46‰. Its situation, moreover, over the continental slope north-west of the Butt of Lewis, differed radically from that of the corresponding feature on the same section of August 1927. The core in May 1929, however, embraced surface waters, but did not reach the bottom. The superior salinity of the core on this section compared with that on the more northerly contemporary section, together with the greater cross-sectional area of water in excess of 35·40‰ salinity, may be taken to signify the slightly greater intensity of the Atlantic Current which is indicated by the volume transport assessments of Table 1. These assessments were of a relatively high order, which may to some extent be accounted for by comparatively small fresher water encroachment against, and therefore impediment of, the oceanic water-mass at the Butt of Lewis end of the section, as indicated on Figure 11, and also by the small dilution apparent near Faroe Bank.

The deepest waters on the south side of the Wyville Thomson Ridge in this case registered a minimum salinity of 35·26‰, but attention is drawn to the curious, apparent isolation at 700 metres depth on the upper slope of the south side of the Ridge, of a small body of high salinity water (35·41‰). This phenomenon is further remarked upon below.

On the north side of the Ridge, with observations as deep as 900 metres, there would appear to have been a complete absence of the Arctic water which characterised the bottom waters of the northern section eleven days before, the minimum salinity recorded between the Ridge and Faroe Bank being 34·92‰, which belongs to bottom Norwegian Sea water. This minimum salinity, however, was registered at the relatively high levels of 500 metres and 600 metres. At 900 metres depth occurred the second combined sub-zero temperature/oceanic salinity observation of this investigation. As will be cited presently, a third instance belongs also to this same section of May 1929.

In view of the palpable illustration in Figure 10 of the probable origin of such radically anomalous conditions, it is accepted that the record of −0·62°C, the minimum temperature registration of the section, with an associated salinity of 35·06‰ at 900 metres depth on the north side of the Wyville Thomson Ridge, is a true record, for the trends of isotherms and isohalines on the left side of Figure 11 also indicate that oceanic water in the neighbourhood of the summit of the ridge was again at the end of May 1929 in near proximity to, if not in juxtaposition with, very cold water, and accordingly it seems reasonable also in this instance to postulate that a small body of oceanic water from the underside of the water-mass about the top of the Wyville Thomson Ridge became more or less rapidly "supercooled" and detached from the parent mass, rolling down the northern slope of the Ridge into the valley between it and the Faroe Bank. The density (σ_t) of this bottom-most water was 28·20.

Maximum temperature of 11·17°C on the surface immediately over the edge of the continental shelf on the section under review, was about 1·5°C higher than the corresponding maximum temperature on the contemporary northern section. Like the other it occurred within the salinity core of the Atlantic Current. This core, however, on the later section, had an average temperature of over 10°C (*ca.* 10·2°C) as against 9°C to 9·5°C farther north. Bottom temperature between the continental slope and the Wyville Thomson Ridge had, most surprisingly, the same minimum temperature of −0·62°C as that recorded in the deep between the Ridge and Faroe Bank, and this minimum temperature on the south side of the Ridge, this time at 1000 metres depth, was again associated with an oceanic salinity, namely, 35·26‰, its density (σ_t), therefore, being 28·37. Higher up on the southern slope of the Ridge, at 700 metres, the above-noted, isolated, small body of high salinity (35·41‰) water was associated with the low temperature registration of 2·57°C, thus giving this water a nuclear density (σ_t) of 28·28.

Following the line of previous deduction and argument from Figure 10 and the present Figure 11, the interpretation of these further anomalies would appear to be similar, the severance of the small bodies of oceanic water concerned from the bulk mass being contingent upon a to and fro traverse of the summit of the Ridge by the bottom end of the narrowly restricted zone of convergence, indicated by the isotherms and isohalines of Figure 11, between the oceanic and cold bottom Norwegian Sea water-masses. Even on this explanation, however, it is difficult to appreciate the origin and retention of the high salinity of the upper isolated patch of oceanic water which apparently by this salinity belongs very nearly to the core of the Atlantic Current, that is, to the uppermost 150- to 200-metre layer of the southern part of the section. Nevertheless, such would appear to have been the high degree of turbulent activity in the waters of the Channel during May 1929, that the observation with its associated low temperature, in view of the supporting evidence from several other still more anomalous records, may not at once be discarded for lack of an obvious and immediate explanation as to its origin.

Nolsø, Faroe—Flugga, Shetland. 22-24 June 1929. Figure 12.

The most prominent feature of this northern section of late June 1929 is the relatively high salinity core of the Atlantic Current—greater than 35·45‰ to maximum salinity of 35·47‰, from 50 to 200 metres—which thus compares almost exactly with the core on the southern section about one month before, except that, in June, the core was again an entirely subsurface phenomenon and was situated a little way *off* and not over the continental shelf. There was, however, practically no dilution of the main body of the oceanic water-mass near Shetland, and only very little towards Faroe. The 35·00‰ isohaline was situated somewhat deeper, at about 500 metres and more, than it has so far appeared on these diagrams, and Figure 12 reveals no sign, by salinity, of the presence of the Arctic water-mass which characterised the deep layers of the same section little more than one month previously.

By contrast, as it were, the minimum temperature of the deep Channel waters was, at −0·98°C, slightly lower than in May. The maximum temperature of the section, namely, 11·41°C, although occurring at the surface at the station nearest to Shetland, was within the central oceanic water-mass of salinity in excess of 35·40‰ and compared more closely with that (11·17°C) of the southern section in May than with the maximum of 9·59°C on the northern section of the same month.

Generally, as between the two approximately parallel sections across the northern part of the Channel in May and June 1929 respectively, the uppermost 200-metre layer of water over the greater part of the region between Faroe and Shetland appears in the interval to have been warmed to the extent of about 1°C to 1·5°C, and to have increased also in salinity by about 0·05‰. As compared, on the other hand, with the southern section of the previous month, conditions in the uppermost layers in June appear relatively unchanged on the whole.

1931

The two Faroe-Shetland Channel sections of May 1931 were practically identical in calendar times and in the respective numbers and positions of the stations occupied, with those of May 1929.

Syderø, Faroe—Papa Stour, Shetland. 16-18 May 1931. Figure 13.

In the dynamical study of this section particular attention was drawn to the occurence of an isolated high salinity value of 35·46‰ at 100 metres depth in mid-section. The apparent validity of this record from dynamical considerations leads to its interpretation on Figure 13 as the nucleus of what appears to be a vortex movement within the oceanic water-mass. As will be seen below (Figure 14) the vortex had its counterpart in a similar salinity distribution, although of a higher denomination, in the middle of the contemporary section over the Wyville Thomson Ridge and again at the depth of 100 metres. It seems highly probable that the two vortices were connected, possibly in the form of a progressive tortional current from over the Wyville Thomson Ridge and directed approximately north-eastward.

In view of the interpretation subsequently to follow, of the above and other more or less isolated high salinity records in this and the three following years and embracing also the northern part of the North Sea (Tait, 1935), these high salinity nuclei, although occurring within the oceanic water-mass, do not properly belong to the Atlantic Current. The core of the Current in the present case was evidently contained by the 35·35‰ isohalines between the surface and about 125 metres on the southern half of the section, embracing maximum oceanic nuclear salinity of only 35·39‰ between 10 and 60 metres on the station immediately over the continental edge.

It will at once be apparent that the above is an appreciably lower Atlantic Current salinity core than that of the same section of May 1929 (Figure 10), and considerably lower than those of (a) the contemporary Wyville Thomson Ridge section of that month (Figure 11) and (b) the corresponding northern section of June 1929 (Figure 12). In comparison with these also, the relatively shallow core of the northern section of May 1931 was of greater lateral extent on the section, which may be taken as further evidence of the greatly reduced intensity of the Atlantic Current, as between May-June 1929 and May 1931, to which the oceanic volume transport assessments of Table 1 testify.

On the other hand, paradoxically it might seem, the Atlantic Current cores of the two August 1927 sections (Figures 8 and 9), which yielded the lowest volume transport assessments of Table 1 as a whole, were of appreciably greater salinity and, on the northern section particularly, lay deeper than the May 1931 core. But it may be recalled that in both cases the August 1927 sections revealed considerable diluting influences on either side the Atlantic Current, and these influences, which scarcely appear on the 1929 sections, or on that of May 1931 between Faroe and Shetland, presumably and effectively impeded the flow of the Atlantic Current in 1927.

On the whole, therefore, it can be said that the interpretations of salinity distributions on the several sections now reviewed "fit in" remarkably well with the respective volume transport results of Table 1.

Some slight fresher water encroachment on the oceanic water-mass towards the Faroe end of the May, 1931 section is indicated by a minimum nuclear salinity of 35·18‰ in the uppermost 50 metres at the second station out from Syderø Island.

Figure 13 again illustrates the concentration of successively lower isohalines towards that of 35·00‰ defining the base of the oceanic water-mass which in this instance was of a markedly undulatory character from about 250 metres on the slope of the Faroe shelf, down to 550 metres—the thickness or depth of the oceanic layer as it crosses the Wyville Thomson Ridge—to less than 400 metres again on the continental slope west of Shetland.

Beneath the oceanic water-mass the entire cross-sectional salinity represents the presence of only bottom Norwegian Sea water in May 1931.

Maximum temperature of 9·50°C in 1931 at the surface within the core of the Atlantic Current, was practically the same as that (9·59°C) of May 1929 registered also at the surface at the same station. In general, the isotherms of Figure 13 follow more or less closely the same trend as the isohalines. The influence probably of the East Icelandic Arctic Current is to be traced also, apart from the indication given by the above-mentioned minimum nuclear salinity near Faroe, in the fall in temperature almost to 7°C in that vicinity.

The minimum temperature of the bottom Norwegian Sea water at −0·80°C appears to be characteristic and contrasts with the minimum of −0·91°C registered in the bottom Arctic water-mass on the same section two years earlier.

Faroe Bank—Butt of Lewis. 27-28 May 1931. Figure 14.

Indication is given above of the probable connection between the highest salinity nucleus of the northern section of May 1931 and that (35·64‰) which appears also at 100 metres' depth in mid-section on Figure 14. A second extraordinarily high salinity of 35·57‰ was recorded on this southern section of May 1931 at 10 metres' depth at the neighbouring station northward to that at which the highest record occurred. Neither of these, however, for reason which will appear later, is a true nuclear salinity of the core of the Atlantic Current.* The core, as on the contemporary section between Faroe and Shetland, may likewise be regarded as having been included by the curves of the 35·35‰ isohalines on the southern section. The true nuclear salinity of this core was an isolated 35·41‰ observation at 20 metres depth on the station approximately midway down the continental slope. Two further isolated observations, each of 35·40‰, one on the same station at 40 metres and the other at 10 metres at the adjacent station northward, are suggestive of a disrupted nucleus, probably the result of turbulent forces which the peculiar shape of the deeper 35·35‰ isohaline implies may arise from the impingement of the Atlantic Current on the Wyville Thomson Ridge.

A further implication of the shape of this isohaline is that of strong upwelling of slightly less saline water from the depths southward of the Ridge into the underside of the Atlantic Current core. This, by reaction, may in some measure account for the apparently great depth of the core itself, to about 750 metres on the continental slope north-west of the Butt of Lewis and almost to the level of the summit of the Wyville Thomson Ridge on its northern edge; and this, in turn, by evidence of the deep-lying (over 600 metres) 35·00‰ isohaline between the Ridge and Faroe Bank, would seem to have at least partially excluded from the deep toe of the Channel, the bottom Norwegian Sea water-mass to be anticipated on this occasion in continuation of that which occupied similar and deeper levels on the northern section some ten days earlier. The single salinity observation below 600 metres, namely at 840 metres practically on the bottom of the valley between the Ridge and Faroe Bank, did not reveal the presence of bottom Norwegian Sea water, but, on the other hand, the associated sub-zero temperature strongly suggests the near proximity of this particular water-mass. The salinity of 35·35‰ which actually was recorded at the 840 metres level, with a temperature of —0·52°C, and therefore a density (σ_t) of 28·43, provides the fourth of these anomalous instances of sub-zero temperature oceanic water of which the first three appeared on the May 1929 cross-sections. The explanation here (Figure 14), for the end of May 1931, is evidently similar to those already given in respect of the earlier examples. A small body of oceanic water has become detached by "supercooling", combined with water movement, from the underside of the oceanic water-mass—note the significance of the proximity of the base of the *core* of the oceanic water-mass to the top of the Wyville Thomson Ridge in relation to the bottom salinity recorded between the Ridge and Faroe Bank—and has "cascaded", to use a term introduced by Cooper and Vaux (1949), down the northern slope of the Ridge into the valley bottom. There seems little doubt that had observations been taken between the 600 metres and 840 metres levels, salinities there would definitely have revealed the presence of bottom Norwegian Sea water. Incidentally, the isohalines entered on this part of the diagram, Figure 14, based on a single vertical column of observations only and assumed to have been more or less parallel to the appropriate part of the 35·35‰ isohaline, should perhaps have been represented as tending to converge towards the upper northern slope of the Wyville Thomson Ridge.

Dilutive influence on the oceanic water-mass is indicated by the diminution of salinity to under 35·00‰ over the continental shelf in the neighbourhood of the Butt of Lewis, but evidence of a similar tendency on the Faroe Bank is very slender.

The highest temperature on this southern section of May 1931, namely 10·57°C, recorded at the surface of the deepest part of the oceanic core, was rather more than 0·5°C less than the maximum (11·17°C) registered at the same position two years before. It is of interest also to note the shape of the 9°C isotherm round the supposed tortional current in mid-section, tending further to support the existence of this phenomenon. The same isotherm, surmounting the upwelled water-mass, had a second deep bight in the thick Atlantic core before rising gradually surfacewards in the mixed oceanic and coastal waters of the continental shelf.

The temperature of the deepest observation (1050 metres) on the south side of the Wyville Thomson

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*As contributory to the number of these extraordinarily high salinity records of the years 1931 to 1934, explanation of which appears under discussion of the 1933 sections, one of which yields the most conclusive evidence as to their origin, may be cited the occurrence of another such value on the outskirts of the Faroe-Shetland Channel region in May 1931. On 26 May, at the position 61°09′N, 7°24′W, that is, about midway between Syderø Island and Faroe Bank, a surface salinity of 35·67‰ was recorded in conjunction with a temperature observation of 9·43°C, the density (σ_t) being thus 27·60 which, as will be seen later, is significant.

Ridge where salinity remained above 35·30‰, was 6·59°C, that on top of the Ridge at 550 metres at exactly 35·30‰ salinity, 7·85°C, and in the deepest sounding between the Ridge and Faroe Bank, —0·52°C.

1933

The Faroe-Shetland Channel hydrographic sections of 1933 were carried out in the month of June, fully three weeks later by the calendar than the corresponding sections, comprising the same numbers and positions of stations respectively, of 1931.

Sydero, Faroe—Papa Stour, Shetland. 9-11 June 1933. Figure 15.

As on the same section in the corresponding month of 1929, the Atlantic Current between Faroe and Shetland in June 1933 was characterised by a central nucleus of water of salinity in excess of 35·45‰ to 35·48‰, but whereas the nucleus of 1929 had depth—from about 50 metres to approximately 230 metres off the continental edge—and a moderate lateral extension of some 30 kilometres, in 1933 it was but a thin laminar layer of scarcely 10 metres in thickness along the 30-metre depth level over a distance of approximately 65 kilometres. Visual comparison of the sectional areas enclosed by the 35·40‰ and 35·30‰ isohalines is sufficient to show that there was apparently a much greater quantity of this highly saline oceanic water on the 1929 section than on that of 1933. The shape of the 35·35‰ isohaline and of those below it in 1933 is suggestive of an upthrust of less saline water into the main core of Atlantic water, tending, but not succeeding, as will be seen to have been the case in some later years, to divide this main core into two parts. The formation, indeed, of the isohalines above that of 35·30‰ particularly, is suggestive of an eddy circulation previously recognised to function at least on occasions in the uppermost waters of the region of this section, and extending in 1933 from over the continental shelf north-westwards more than half-way along the section.

Maximum salinity values on the 1933 section, except one, were confined to those already cited in the dynamical discussion and included within the laminar nucleus of the Atlantic water-mass. The odd case, however, is the extraordinary record of 35·29‰ taken at the deepest sounding on the section, namely, 1140 metres, in conjunction with a temperature of —0·86°C (σ_t=28·40). This, although the explanation of it is not so apparent from Figure 15, is obviously still another case, the sixth, of a kind closely similar to those already considered under 1929 and 1931. At some antecedent date a small body of oceanic water has been ruptured from the main mass and has cascaded down either the continental slope or the Faroe shelf slope, the former being the more likely perhaps, to rest in the bottom of the Channel where it was encountered on 10 June 1933. Observations are too few in the deep layers of the Channel to enable realistic delineation of this isolated, supercooled, oceanic, body of water to be made on Figure 15.

The remaining salinity characteristics of the diagram are self-evident, namely, the very minor dilution of the Atlantic Current near Shetland, the comparatively small effect, apparently, of northerly derived waters on the oceanic water-mass, in the neighbourhood of Faroe, and the absence of Arctic as distinct from bottom Norwegian Sea water in the deeper layers below about 400 to 500 metres where salinity was fairly uniform between 34·90‰ and 34·94‰.

The deep layers were thus of the same salinity in June 1933 as in June 1929, but reached scarcely such a low temperature minimum (—0·86°C) as two years earlier (—0·98°C).

The maximum temperature of 12°C on the section of June 1933, recorded superficially within the body of Atlantic water of greater salinity than 35·40‰, compares with 11·41°C similarly registered on the same section in June 1929. The zero isotherm, except for a downward bight of about 100 metres on the 1933 section, was similarly situated at between 600 metres and 700 metres on both sections.

Compared with the corresponding sections of the month of May in 1929 and 1931 respectively, when temperatures of just over 7°C to about 7½°C were recorded in the waters east of Faroe, the June sections of 1929 and 1933 reveal a substantial rise in temperature of approximately 2°C in this region within the period of about one month.

Faroe Bank—Butt of Lewis. 20-22 June 1933. Figure 16.

The section on this occasion was worked for more than half its length from Faroe Bank southwards in winds of Beaufort force 5 and 4. This probably accounts for a small deviation of the research ship from the true course about mid-section, thus "missing", at the third station down the section and as the bottom contour on Figure 16 shows by comparison with earlier similar diagrams of the same section, the summit proper of the Wyville Thomson Ridge.

As represented in Figure 16 the section presents two prominent features in regard to the distribution of salinity. In the upper waters above 300 metres there appear no less than eight salinity nuclei around maximum isolated values of, in descending order of magnitude, 35·94‰, 35·62‰, 35·60‰, 35·57‰, 35·55‰, 35·52‰, 35·51‰ and 35·42‰. At least three more high values in the upper waters of the section, of similar order to the intermediate and lower of those cited, while they are isolated vertically, are associated horizontally with one or more of the above. In passing, reference may again be made to the author's earlier investigation of similar records in the northern North Sea (Tait, 1935). There, in Figure 1c of that paper, are to be found no fewer than nineteen extraordinarily high salinity values of similar order to the foregoing, to a maximum indeed of 36·02‰, recorded in the months of June and July 1933—mainly the latter—but including also a single record in each of the months of August and October following. There seems therefore to be no room for doubt that these high and even extraordinarily high salinity values in the Faroe-Shetland Channel in 1931 and 1933, and in the northern North Sea in each year from 1931 to 1934 inclusive, were in fact true records. No Faroe-Shetland traverse was made by the Scottish research ship either in 1932 or 1934.

Two of the above-mentioned high salinity records of June 1933, those of 35·55‰ and 35·51‰, occurred superficially at almost either end of the section. The supreme maximum for the section, namely 35·94‰ at 20 metres, was completely isolated vertically between observations of 35·37‰ at 10 metres (under 35·55‰ at the surface) and 35·41‰ at 30 metres. It was not even included, nor again was the 35·57‰ value, within what may be regarded as the core of the Atlantic Current as defined by the 35·45‰ isohaline on Figure 16, as were three of the high nuclear values above-cited. Along with a value of 35·51‰ at 40 metres depth at the neighbouring station, the nucleur value of 35·62‰ at 30 metres was, as it were, the other of two foci of a long horizontal laminar layer, similar to that delineated on the contemporary Faroe to Shetland section and defining in section the central nucleus, within the core, of the Atlantic Current. Another nucleus, centred on a 35·52‰ value, appeared to be isolated centrally within the core at 75 metres depth, but the third nucleus based on the maximal record of 35·60‰ occurred at the bottom, just below the continental edge, of the Atlantic water core which, below about 100 metres, appears to have assumed a columnar form.

The foregoing, however, are still not all of the very high salinity figures recorded on the Faroe Bank-Butt of Lewis section in June 1933. The second prominent salinity feature of the section is the only one of its kind so far encountered on these Faroe-Shetland Channel traverses, and appears most opportunely to furnish the clue to the origin of the above-cited high salinity values.

It is clear from Figure 16 that in the deep waters below 500 metres on the south side of the Wyville Thomson Ridge an unusually highly saline body of water was present in June 1933, which, on further consideration, it would seem can have had no other origin than that of the low level efflux of Mediterranean Sea water through the Strait of Gibraltar into the North-Eastern Atlantic Ocean. Essentially, the deep water salinity distribution represented on the right of Figure 16 depends upon two high salinity records at adjacent stations, namely, 35·73‰ at 840 metres (almost on the bottom) at the position, 59°44′N 7°15′W, and 35·61‰ at 700 metres at 59°31′N 7°05′W. Although these values are considerably lower in magnitude than that (36·50‰) cited by Wüst (1935), as characteristic of Mediterranean water immediately westward of the Strait of Gibraltar, they were associated with temperatures which entail densities within the σ_t range of 27·6 to 27·8, between which Sverdrup, Johnson and Fleming (1942, p. 670) state that the Mediterranean water efflux spreads into the Atlantic Ocean, first of all and in the main northward off the Portuguese coast and then westward in the region off the English Channel and to the south-west of Ireland. It seems that in 1933, and indeed progressively in the four years 1931 to 1934 inclusive, some of this Mediterranean water, or Gulf of Gibraltar water as Cooper (1952) proposes it may more appropriately be named, continued northward at an intermediate level off the west coast of Ireland, that it cooled, and by admixture, freshened on the way until it encountered the barrier of the Wyville Thomson Ridge. Upwelling, of which there is evidence in the course of the 35·35‰ isohaline on Figure 16, and consequential turbulent movement caused by the obstruction, may reasonably be invoked to account for the dispersal of so many isolated high salinity nuclei in the upper waters of the section both within and without the main central stream of the oceanic water-mass. This is, in fact, in small scale no doubt, the picture of the heterogeneous nature of Gulf of Gibraltar water throughout the North Atlantic Ocean which is presented by Vallaux (1936).

The core of the Atlantic Current, as represented in June 1933 on the section under review by the 35·45‰ isohaline which, it will be observed from Figure 16, did not reach the sea surface, did not either include the maximum temperature of the section, namely 13·14°C, which was registered at the surface over the edge of the continental shelf in water of only 35·35‰ salinity. The top 50 to 75 metres of water recorded a temperature in excess of 10°C along the entire section except in the centre of the Atlantic water core, where the 10°C isotherm dipped to about 140 metres. The maximum nuclear oceanic salinity of the core was 35·48‰.

The course of the 9°C isotherm which lay in the 200-metre level for almost half the section from Faroe Bank, and thereafter plunged steeply to practically 600 metres in parallel with the 35·40‰ isohaline, is characteristic except for its final upturn from 600 metres to about 450 metres on the continental slope on which generally this isotherm reaches its deepest sounding. The upturn, however, is in conformity not only with the further course of the 35·40‰ isohaline after a maximum sounding of practically 500 metres, but also with the apparent slope of the upper surface of the lower-lying, diluted and cooled Gulf of Gibraltar water-mass.

There is only a small representation on Figure 16 of the bottom Norwegian Sea water which is normally found on the north side of the Wyville Thomson Ridge on this section, but this may be due to the deviation of the research vessel from course, which has already been referred to, and the consequent traverse of the "foot" of the Faroe-Shetland Channel rather nearer to its toe than intended. The representation, however, in a minimum temperature of −0·78°C in 760 metres and minimum salinity of 34·93‰, is characteristic and in good agreement with the deep water characters of the northern section eleven days before.

1934

Three hydrographic sections between Faroe and Shetland by the Danish research ship *Dana* furnish information for the late spring and summer period of 1934.

Nolsø, Faroe—Flugga, Shetland. 21-22 April 1934. Figure 17.

Nuclear Atlantic water of scarcely above 35·40‰ salinity appeared in small quantity at the Shetland end of the section almost entirely over the continental shelf. The core of the Atlantic Current at this time may be reckoned to have been more nearly defined by the 35·35‰ isohaline, thus including also the maximum temperature of the section, namely 8·60°C, registered at the surface off the continental edge. The bathymetric limit of the oceanic water on the section reached to about 560 metres on the continental slope from a minimum depth, scarcely 15 miles distant from the slope, of only 325 metres. This minimum in the thickness of the oceanic water-mass evidently signified, according to the trends of both isotherms and isohalines on Figure 17, an upthrust into the Atlantic Current of colder, less salt water from below. The bottom water-mass, according to its salinity, 34·94‰-34·91‰ was of bottom Norwegian Sea water only, there being no evidence of the presence of any Arctic water. The minimum temperature of this bottom water was −0·92°C.

Salinity in the upper water layers declined to about 35·20‰ in the neighbourhood of Faroe, local temperature reaching almost to 6°C, so that, on the whole, Arctic water influence in this region was relatively very small.

Nolsø, Faroe—Flugga, Shetland. 31 May-1 June 1934. Figure 18.

Six weeks later, when the above section was repeated, maximum temperature had risen by scarcely one degree to 9·49°C which was registered superficially in mid-section, but maximum salinity had apparently diminished. No water of 35·40‰ salinity was encountered at the end of May and the beginning of June and even that of 35·35‰ to 35·39‰ salinity was patchy, occurring in practically the same positions as the 35·40‰-35·44‰ salinity water six weeks earlier. The trends of the lower oceanic isohalines and isotherms on this southern half of the section were the reverse of those on the April section, the 35·00‰ isohaline penetrating to 620 metres almost in the same position as its minimum depth was registered six weeks before.

The bottom water of the Channel on the second occasion had apparently the same salinity as previously, denoting bottom Norwegian Sea water, but the minimum temperature of —0·86°C was scarcely so low.

There was even less evidence of dilution of the oceanic water-mass by Arctic influence in the east Faroe neighbourhood than previously.

Nolsø, Faroe—Flugga, Shetland. 11-13 July 1934. Figure 19.

After a further interval of six weeks a third traverse of the line from Faroe to Shetland was made by *Dana* through eight stations instead of the usual ten or eleven. The outstanding feature of Figure 19 is the almost complete division from below, in about the middle of the section, of the oceanic water-mass by the incursion again, as was indicated on the April section, of cold, comparatively fresher water. By the salinities of 34·88‰-34·87‰ recorded at 300-400 metres depth off the slope of the Faroe shelf, there is little doubt on this occasion of the origin of this incursion as from the East Icelandic Arctic Current, particularly from that part of it which Helland-Hansen and Nansen (1909, p. 293) cite as of general occurrence at similar intermediate levels along the northern slope of the Faroe-Iceland ridge.

The bottom water-mass of the Channel was once more entirely bottom Norwegian Sea water with a minimum temperature, again very low as in April, of —0·97°C.

In July, too, a nucleus of 35·40‰-35·42‰ salinity water which was recorded in the April section, but was absent in that of May-June, reappeared within the core of the Atlantic Current defined by the 35·35‰ isohalines on the southern half of the section. On the other side of the cold-water divide, another nucleus of salinity in excess of 35·30‰ occurred within this part of the oceanic water-mass, the maximum temperature of which was 11·96°C in comparison with the maximum of 12·8°C on the southern half of the section, both maxima occurring on the surface.

As will be seen later, Figure 19 represents conditions which from time to time appear to be typical of Faroe-Shetland Channel hydrography.

From all three *Dana* sections of 1934 there is to be noted the complete absence of abnormally high salinity records indicative of Gulf of Gibraltar water, although they continued to appear in this year in the northern North Sea (Tait, 1935).

1935

Temperature and salinity distributions on the Faroe-Shetland Channel hydrographic sections of June, 1935, are illustrated in Figures 20 and 21.

Faroe Bank—Butt of Lewis. 27 May, 5-6 June 1935. Figure 20.

It has already been remarked in the first part of this report that on account of weather conditions only seven of the nine stations comprising the full section at this time between the Butt of Lewis and Faroe Bank were covered in one continuous traverse in June 1935. Probably for the same reason, the vessel's course did not, as intended, pass obliquely over about the middle of the Wyville Thomson Ridge, sounding the deep waters on either side of it. But although the Ridge is not recognisably defined by the bottom contour on Figure 20, its effect, hydrographically, is indicated by the course of the 35·40‰ isohaline showing the upsurge of relatively fresher water from the deeper levels on the south side of the Ridge into the salter oceanic water of the upper layers above 500 metres.

The absence also of abnormally high salinity values in June 1935, in contradistinction to June 1933 and May 1931, has already been remarked. Maximum salinity of 35·50‰ was concentrated in June 1935 in the uppermost 60 metres about a single station near the middle of the section, in association with the maximum temperature on the section of 10·50°C to 10·66°C. It is not improbable, however, that this salinity did denote a relic of the Gulf of Gibraltar water which evidently reached in each of the previous four years, notwithstanding the lack of evidence for it on the *Dana* Faroe-Shetland Channel sections of 1934, into this region and also into the northern North Sea (Tait, 1935).

The core of the Atlantic Current about the above nucleus of 35·50‰ salinity is well defined by the 35·45‰ isohaline with which the isotherm of 10°C is more or less closely asscoiated. The downward trend of the 9°C isotherm, especially marked towards the continental slope, is again characteristic and broadly follows the similar course of the 35·40‰ isohaline through the section from Faroe Bank southwards.

Except at the level of 500 metres near the bottom at that station which was probably on or about the top of the Wyville Thomson Ridge, no temperature of less than 8°C was registered on the section as traversed, and at the deepest soundings, all on the southern side of the Ridge, salinities of over 35·30‰ were recorded.

Compared with former traverses of this section at the same time of year the following points of difference are to be noted. In cross-section the main body of oceanic water as defined by the 35·40‰ isohaline bulked very much larger in 1935 than in either 1933 or 1929. Save for the immediate and restricted neighbourhoods of the several high salinity nuclei on the 1931 section, the isohaline of 35·40‰ did not appear in that year. Except for difference of shape and the additional difference that this did not reach the surface in 1933, the Atlantic water core of greater than 35·45‰ salinity was approximately of the same cross sectional area in 1933 as in 1935, both being considerably greater than that of 1929 which also included surface waters.

Maximum temperature on the section was highest in 1933 at 13·14°C, compared with 10·66°C in 1935, 10·57°C in 1931 and 11·17°C in 1929.

Nolsø, Faroe—Flugga, Shetland. 15, 17-19 June 1935. Figure 21.

The most immediately noticeable feature of this section, as compared with its 'fellow' to the south which was worked almost two weeks earlier, is the absence within the body of the Atlantic Current, as defined by the 35·40‰ isohaline, of a core of salinity 35·45‰ and over. Maximum temperature in excess of 10°C (to 10·13°C) was still evident within the Atlantic water on the northern section, but salinity there did not exceed 35·44‰ as compared with 35·50‰ approximately midway between Faroe Bank and the Butt of Lewis, which supports the interpretation already suggested that the latter salinity was probably significant rather of Gulf of Gibraltar water than of oceanic water proper.

There seems to have been remarkably little fresher water intrusion into the oceanic water-mass in June 1935 on either the Faroe or the Shetland sides of the northern section. Below 200 metres the fall in salinity with depth was rapid, from 35·30‰ over the greater part of the section to 35·00‰ at 400 metres depth, with the characteristic dip in all isohalines and isotherms along the continental slope.

The zero isotherm in June 1935 lay between 600 metres and 700 metres as in June 1933, May 1931, and June 1929, the May 1929 section differing radically in this respect as already noticed.

The bottom water-mass in June 1935 had a salinity of over 34·95‰ and so differed from any of the Faroe-Shetland sections so far reviewed. This bottom water probably consisted mainly of bottom Norwegian Sea water, but with some admixture apparently of intermediate water from the same regional source. The minimum temperature of this higher salinity bottom water of June 1935 was —0·89°C, comparing with —0·98°C in June 1929 and —0·86°C in June 1933.

There was apparently no Arctic water present in the Channel in June 1935.

1936

The Faroe-Shetland Channel sections of 1936 were geographically the same as those for 1935, except that in the later year a truer course was followed over the southern section which comprised the full number of stations to that date, namely, nine.

Faroe Bank—Butt of Lewis. 28 May, 2-4 June 1936. Figure 22.

The core of the Atlantic Current within the 35·40‰ isohaline extended over the greater part of the section in June 1936 and reached a depth of 400 metres to the north of the Wyville Thomson Ridge as compared with only 300 metres south of it. The nucleus of the core, of salinity 35·44‰, embraced four stations in mid-section to a depth of 80 to 100 metres. A single, isolated, maximum salinity observation of 35·50‰, recorded at 20 metres depth on longitude 8°W, may again be taken, as in June 1935, to indicate the mere attainment of the threshold to the Faroe-Shetland Channel by Gulf of Gibraltar water.

Only very little, more or less superficial, encroachment of fresher water on the oceanic water-mass was apparent near the Butt of Lewis and practically none at Faroe Bank.

The lack of deep hydrographic soundings on the station on longitude 8°W precludes definition of the characters of the bottom water filling the Channel below the level of the Wyville Thomson Ridge. The temperature of —0·32°C which was recorded at 800 metres at the neighbouring station southward on the section probably does not represent the minimum temperature of this water which, by its salinity of 34·94‰, was bottom Norwegian Sea water.

On the south side of the Ridge the deepest waters had a salinity of between 35·25‰ and 35·30‰.

Maximum temperature on the section was 10·48°C, recorded at 10 metres just outwith the south-eastern part of the core of the Atlantic Current. This compared with 10·66°C in June 1935 on the same section. The slope of the 9°C isotherm and its final descent to the continental slope is again characteristic of these Faroe-Shetland Channel sections. The deep waters between the slope and the Wyville Thomson Ridge registered temperatures a little over 7°C, while on the north side of the Ridge the presence beneath the oceanic water-mass of "northern" water was associated with sub-zero temperature at about 550 metres.

Nolsø, Faroe—Flugga, Shetland. 5, 13-15 June 1936. Figure 23.

The core of the Atlantic Current, as defined by the 35·40‰ isohaline, enclosing a maximum nuclear salinity of 35·42‰, was confined on this northern section to the immediate neighbourhood of a single station just within the continental edge, and extended in depth to scarcely 100 metres. Even the 35·35‰ isohalines apparently embraced a much smaller body of water on this section than did the 35·40‰ isohaline on the southern section almost two weeks before.

The evidence for dilution of the oceanic water-mass on its eastern (Shetland) side was even less than that shown on Figure 22 in the vicinity of the Butt of Lewis on the contemporary southern section. At Faroe, also, the Atlantic incursion had only slightly deteriorated in salinity by reason of fresher northern influence.

The bottom waters below a somewhat undulating 35·00‰ isohaline between 350 and 530 metres were entirely of bottom Norwegian Sea water with a salinity minimum of 34·90‰.

Maximum temperature of 10·56°C was registered on the surface some fifteeen miles eastward of the Atlantic Current core, the maximum temperature of the core being 10·44°C, practically the same as that recorded in a corresponding position on the southern section. In this instance, in June 1936, the 9°C isotherm lay entirely above the level of the continental edge, the 8°C isotherm dipping only a little below this level, while towards Faroe the temperature of the water column remained above 8°C. Minimum temperature of the bottom waters was recorded at —0·96°C.

1937

Both Faroe-Shetland Channel sections of 1937 present in more marked degree the feature which was specially noted on the *Dana* section of July 1934 (Figure 19).

Nolsø, Faroe—Flugga, Shetland. 21-23 May 1937. Figure 24.

Figure 24 shows that on this northern section in May 1937 the main body of oceanic water was more or less completely divided in mid-section by a body of very cold and fresher water, the influence of which was evident in the surface water at the midmost station of the section in a lowering of the neighbouring surface temperature by as much as 2½°C to nearly 3½°C. At the station in question, within the uppermost 60 metres, temperature declined from 6°C to nearly 4°C, and in the next 40 metres to below 3°C. At the same level, i.e., 100 metres, at the neighbouring stations on either side, about 15 miles away in each case, the temperatures registered were, to the north-west, somewhat below 8°C, and to the south-east, appreciably above 9°C. The vertical decline in salinity with depth was on the whole less marked, but at 100 metres, 35·18‰ at the midmost station was on a level with 35·31‰ on one side and 35·35‰ on the other. At 200 metres, the contrast of the midmost station with its neighbours was equally marked in the following recorded observations:—

	61°28′N 3°42′W		61°21′N 3°10′W		61°14′N 2°40′W	
	t°C	S‰	*t*°C	S‰	*t*°C	S‰
200m.	6·92	35·28	2·66	34·97	7·44	35·35

It seems obvious that the colder, fresher, water influx into the Channel which is so manifestly represented by the above conditions must have derived from the north, Helland-Hansen and Nansen's (1909, p. 293) tongue of Arctic water on the slope of the Faroe-Iceland Ridge at once suggesting itself. But, while the temperature (minimum —0·87°C) may, the salinity (34·94‰-34·90‰) of the bottom waters of the Channel in May 1937 does not, support this inference. It seems more probable that the influx originated from the deep Norwegian Sea.

An effect of the deep incision into the base of the oceanic water-mass was the downward thrust of this base on either side the 'divide' to below 700 metres off the Faroe shelf slope and to about 670 metres on the continental slope, both depths being substantially below the level of the summit of the Wyville Thomson Ridge which defines the thickness of the oceanic mass as it enters the Channel.

East Icelandic Arctic Current influence in May 1937 was scarcely perceptible in the east Faroe neighbourhood where it is generally to be traced in the lowering of both temperature and salinity. On the northern side of the divide the core of the Atlantic Current was of 35·31‰ to 35·32‰ salinity and, towards Faroe, salinity was still scarcely below 35·30‰. Temperature diminution was also practically negligible.

The other and main part of the Atlantic Current core, on the southern half of the section, had a maximum nuclear salinity of 35·44‰ within the 35·40‰ isohaline, and included the maximum temperature of the section, namely 9·81°C.

Faroe Bank—Butt of Lewis. 28-30 May, 3 June 1937. Figure 25.

In its main features Figure 25 is similar to Figure 24 representing the contemporary northern section. The main oceanic water-mass is again, over the Wyville Thomson Ridge, almost sub-divided by a cold Norwegian Sea water-mass intrusion, the influence of which can be traced down the southern slope of the Ridge into the depths between it and the continental slope. There, at 1000 metres, a salinity of 35·09‰, which is abnormally low for this position, was associated with the temperature of —0·71°C. Even at 800 metres depth, vertically above this heavy (σ_t=28·24) water, the observations of —0·36°C with 35·09‰ combine to denote water of similar density (σ_t=28·22) which has obviously come from the north over the Wyville Thomson Ridge. The bottom water, at 850 metres, on the north side of the Ridge had the properties of bottom Norwegian Sea water, i.e., sub-zero temperature (—0·36°C) and salinity of 34·93‰.

The two parts into which the oceanic water-mass was divided on the southern section showed similar differences in their characteristics of temperature and salinity as on the northern section, although in lesser degree as might be expected. Comparing the relative parts of the two sections, the main core of the Atlantic Current—that to the southward of the divide—although of much greater cross-sectional area on the southern section, retained its temperature and salinity practically unimpaired from south to north—9°C to 10°C and 35·41‰ to 35·44‰. The other part of the core on the northern part of each section declined in temperature from between about 8°C and 9°C on the southern section to between about 7°C and 8°C on the northern one, and diminished also in salinity from 35·36‰-35·38‰ to 35·31‰-35·32‰.

As can be seen from Figure 25 there was considerably more evidence of fresher water encroachment on the oceanic water-mass at the southern end of the Wyville Thomson Ridge section than in the corresponding region north-west of Shetland.

In the year under review, however, there was a complete absence of those salinity observations which denote the presence of Gulf of Gibraltar water, indicating that this influence which apparently began in the Faroe-Shetland Channel region no later than 1931 and waxed in intensity yearly to 1933, or perhaps 1934, thereafter subsiding until 1936, had by 1937 disappeared from these northern latitudes.

1938

Nolsø, Faroe—Flugga, Shetland. 3-4 May 1938. Figure 26.

Two months before the same line with a greater number of stations was repeated by the Scottish research vessel *Explorer*, the Danish research ship *Dana* traversed the hydrographic section between Shetland and Faroe, including eight stations between the Island of Nolsø on latitude 62°N and the northmost point of Shetland.

There are no particularly outstanding features on Figure 26. Two maximum nuclear salinities of 35·46‰, one in the surface at about mid-section and the other at 50 metres depth on the station nearest to Shetland, indicate the considerable lateral extension of an Atlantic Current core which apparently bathed the western shores of Shetland and reached its maximum depth of nearly 200 metres on the continental edge, after varying in depth between 50 and 100 metres along the greater part of the south-eastern half of the section. Its maximum temperature was 9·24°C.

Towards the western slope of the Channel both isotherms and isohalines indicate a modified form of the phenomenon first observed on the July section of 1934, and strikingly illustrated in Figures 24 and 25 in respect of the pair of sections for May 1937, namely, that of a wedge of cold, low salinity, water cleaving the underside of the oceanic water-mass, in the present instance from about 200 metres downwards. Both the salinity and the temperature of this intrusion suggest its derivation from the intermediate waters of the Norwegian Sea.

The bottom water-mass of the Channel in May 1938 was of bottom Norwegian Sea water with a salinity of 34·94‰ to 34·90‰ and minimum temperature of —0·78°C.

Temperature and salinity reduction from the main oceanic water-mass north-westward towards Faroe, almost to 7°C and to 35·25‰ respectively, suggest a small amount of fresher water admixture from the north.

Faroe Bank—Butt of Lewis. 26-27 June, 2-3 July 1938. Figure 27.

As mentioned in the first part of this report, the above hydrographic section was accomplished in two stages with an interval of five days between them, the hiatus occurring in mid-section. This circumstance, however, would not appear to have had any very material effect upon the temperature-salinity distributions on the section as a whole as these are illustrated in Figure 27. The break in the section evidently took place almost on the western edge of the core of the Atlantic Current as defined by the 35·45‰ isohaline around maximum oceanic nuclear salinity to 35·48‰. The core, on this occasion, extended in bulk to the considerable depth of 500 metres and reached to within 50 metres of the sea surface, with two small nuclei, separated from the main core and still nearer to the surface, but scarcely breaking it.

Within the main 35·45‰ salinity core there was, additionally, a singular maximum salinity nucleus of 35·52‰ situated at 80 metres depth. This nucleus again, as in 1935 and 1936, but missing 1937, is to be taken as probably indicative of a trace of Gulf of Gibraltar water. It was contained within a pronounced dip to about 175 metres, from between 50 and 75 metres, of the 10°C isotherm under the maximum temperature observation of the section, namely, 11·40°C.

Corresponding with the depth of the main Atlantic water core, the 9°C isotherm also dipped steeply to, and on the southern half of the section, practically coincided with, the 500 metres level.

On the northern half of the section a second oceanic core, defined by the 35·40‰ isohaline and containing a nucleus of maximum salinity 35·46‰, is to be observed on Figure 27 lying alongside the steep slope of the Faroe Bank between about 100 and 300 metres. It looks as if this core may have attained its position on the section by way of the west and north of Faroe Bank.

Only diluted oceanic water of salinity 35·01‰ with the low temperature of 1·24°C was sounded at the maximum depth of observations, namely, 680 metres, on the north side of the Wyville Thomson Ridge, while on its south side even at 1000 metres, salinity of 35·36‰ to 35·40‰ was recorded in association with temperature in excess of 8°C.

Nolsø, Faroe—Flugga, Shetland. 5-6 July 1938. Figure 28.

In the interval between this section and the one immediately before it, it is evident from Figure 28 that the core of the Atlantic Current within the 35·45‰ isohaline had considerably diminished in cross-section between the region of the Wyville Thomson Ridge and the north-west of Shetland. As on the southern section this core did not attain to the sea surface farther north, but its depth here scarcely reached 150 metres as against 500 metres at the threshold to the Channel. Again, on the northern section as on the southern one, several broken-off parts apparently from the main Atlantic core appeared in the uppermost water layers, but still more remarkable would appear to be the recurrence within the northern core at a depth of 60 metres, and in a corresponding position laterally on the section, of the isolated high salinity observation greater than 35·50‰—in the latest case, 35·59‰—which by inference from previous circumstances in this examination is presumed to signify Gulf of Gibraltar water.

There are also to be observed, however, on Figure 28, almost alongside the western boundary of the oceanic core, two isolated *minimum* salinity nuclei situated one above the other on the same station vertical and underneath the superficial freshening influence which may have been responsible for the suppression of the core beneath the surface.

The second Atlantic water core of the southern section, that against Faroe Bank, was also represented in the northern part of the Faroe to Shetland section. It was, too, of considerably smaller cross-sectional area on the latter, like the main core counterparts, and appeared also at a lesser depth (40 to 100 metres), but retained its nucleus of almost the same maximum salinity—35·48‰—south-westward of Faroe as off the Faroe Bank three days before.

The maximum temperature on the section was recorded on the surface, and at 11·44°C corresponded almost exactly with the maximum temperature of the southern section.

Neither temperature nor salinity declinations over the shallower regions of the continental and Faroe shelves are indicative of really material fresher water intrusion at either end of the northern section.

The outstanding feature of Figure 28, however, is the extraordinary salinity configuration of the deeper waters. True bottom Norwegian Sea water with salinity from 34·92‰ to 34·94‰ and a minimum temperature of −0·61°C is suggestively represented as an intrusion into a larger water-mass with sub-oceanic salinity of 34·95‰ or 34·96‰ to 34·99‰ and a minimum temperature of −0·59°C in its upper levels (above about 800 metres), but very much lower, namely −0·92°C, in its deepest sounding of almost 1400 metres.

Still more remarkable, although the less so by reason of similar instances previously encountered in this examination (*vide* Figures 10, 11, 14, 15 and 25), is the apparent isolation within the latter water-mass of one substantial and one minor body of heavy (σ_t=28·18 to 28·20), diluted, oceanic water of salinity 35·01‰ to 35·04‰ against the lower slopes—below about 900 metres—respectively of the Faroe Islands shelf and the continental shelf. It can only be presumed in this latest instance of the phenomenon that antecedent turbulent conditions, of which the striking salinity configuration of Figure 28 is perhaps still reminiscent, caused these isolations of heavy oceanic water in similar fashion to those already described and, in the particular instance of the corresponding section of mid-May 1929, so neatly illustrated by the conditions actually observed on that occasion.

1939

Nolsø, Faroe—Flugga, Shetland. 17-18 June 1939. Figure 29.

The highest salinity water (35·40‰-35·43‰) of Atlantic origin forming the core of the Atlantic Current on this first of three sections in the summer of 1939 was apparently pressed against the continental slope on which it reached a maximum depth of about 450 metres, and encroached over the continental shelf nearer to Shetland than usual. Its maximum temperature of 10·65°C was recorded in the uppermost 10 metres about the middle of the core. Only very slight fresher water dilution of the oceanic water-mass was evident in the small diminutions of both temperature and salinity towards the Faroe Islands, and in minor minimum nuclear salinities within the body of the 35·30‰ plus water.

The great bulk of the deep water-mass on the section was of bottom Norwegian Sea water, of salinity 34·91‰ to 34·94‰, with minimum temperature of —0·92°C.

Faroe Bank—Butt of Lewis. 26-27 June 1939. Figure 30.

In comparison with the above northern section overtaken in the previous week, the much greater lateral extension of high salinity (>35·40‰) oceanic water between Faroe Bank and the Butt of Lewis is at once apparent from Figure 30, and on this southern section this central body of the Atlantic water-mass included two inner nuclei, in excess of 35·45‰ salinity, which did not appear between Faroe and Shetland. Maximum temperature also on the southern section, at 11·68°C, was one whole degree above that recorded farther north.

Fresher water was recorded superficially near the Butt of Lewis, but was hardly in evidence over Faroe Bank.

Bottom waters between the continental slope and the Wyville Thomson Ridge were of a salinity scarcely below 35·30‰ and temperature above 8°C, while on the north side of the Ridge, in the toe of the Channel, bottom Norwegian Sea water with a minimum temperature of —0·72°C was indicated by salinity observations of 34·90‰ to 34·94‰.

Nolsø, Faroe—Flugga, Shetland. 13-14 July 1939. Figure 31.

Within one month of the *Explorer* section over the same line, the Danish research ship *Dana* repeated the traverse with three fewer stations. Comparison between Figures 29 and 31 shows considerable correspondence between the conditions of June and July 1939 in this northern part of the Channel region. The core of the Atlantic Current was defined in practically the same position and dimensions on both occasions, with indication of somewhat fresher conditions near Shetland in July.

On the other hand, whereas in June the great body of the oceanic water-mass above the 35·30‰ isohaline occupied, almost unbroken, the major area of the section above 100 to 200 metres, in July distinctly fresher water practically in the middle of the section divided this upper water-mass into two substantial parts.

Maximum temperature of 11·39°C in July compared with the maximum of 10·65°C at the same station one month before.

The deep water of both sections, while of the same bottom Norwegian Sea water salinity in the two months, apparently had a lower minimum temperature, by 0·10°C, in June than one month later.

Summary and Conclusions

Although investigations in the Faroe-Shetland Channel region from 1927 to 1939 inclusive took place all within the five calendar months from April to August inclusive, in fact mainly during May and June, they present a number of significant features concerning temperature and salinity distributions in addition to the dynamic aspects already dealt with in the first part of this report.

The Core of the Atlantic Current

The core of the Atlantic Current is a common and more or less conspicuous feature of the twenty-four sectional diagrams which have been studied. In their definitive characters of boundary and maximum nuclear salinity conditions it is evident that these cores vary from time to time. The more readily to appreciate this variation the relevant conditions are summarised in Table 4.

TABLE 4

The Atlantic Current Cores and Maximum Nuclear Salinities in the Faroe-Shetland Channel, 1927-1939.

Year	Month	FAROE BANK—BUTT OF LEWIS		FAROE—SHETLAND	
		Core Boundary Salinity, ‰	Maximum Nuclear Salinity, ‰	Core Boundary Salinity, ‰	Maximum Nuclear Salinity, ‰
1927 ..	Aug.	35·40	35·42	35·40	35·45
1929 ..	May	35·45	35·46	35·40	35·42
	June	—	—	35·45	35·47
1931 ..	May	35·35	35·41	35·35	35·39
1933 ..	June	35·45	35·48	35·45	35·48
1934 ..	April	—	—	35·35	35·44
	May/June	—	—	35·35	35·39
	July	—	—	35·35	35·42
1935 ..	June	35·45	35·48	35·40	35·44
1936 ..	June	35·40	35·44	35·40	35·42
1937 ..	May	35·40	35·44	35·40	35·44
1938 ..	May	—	—	35·40	35·46
	June/July	35·45	35·48	35·45	35·48
1939 ..	June	35·40	35·46	35·40	35·43

There are clearly three grades of boundary salinity of the Atlantic Current core in the Faroe-Shetland Channel, namely, 35·35‰, 35·40‰ and 35·45‰. With each of these is associated in Table 4 a small range, of the order of 0·02‰ to 0·05‰, of maximum nuclear salinities. The three ranges overlap to some extent, but the means of the ranges are mutually distinct at 35·41‰, 35·44‰, and between 35·47‰ and 35·48‰ respectively.

Gulf of Gibraltar Water Intrusions

None of the above values encroaches upon the still higher orders of salinity observations which began to make their appearance on the Faroe-Shetland Channel sections of 1931, which increased in magnitude and in numbers until 1933—until 1934 in the northern North Sea (Tait, 1935)—and declined again in both respects until only singular observations of the lowest of these orders appeared in 1938.

It was particularly fortunate that the timeous Faroe Bank to Butt of Lewis section of June 1933 (Figure 16), over the Wyville Thomson Ridge, should furnish such specific evidence of the true significance of these high magnitude salinities, for there can be little doubt that, as argued in the foregoing text, they were manifestation of the inclusion within the oceanic water-mass of what Cooper (1952) has designated Gulf of Gibraltar water. And further, as exemplified on several diagrams, but especially Figures 14 and 16, the manner of their incorporation in the waters of true oceanic origin, doubtless due to the turbulent conditions induced by the impingement of the water-masses on the Wyville Thomson Ridge, is a neat practical illustration of Vallaux's (1936) conception of heterogeneous or random scattering in the oceanic water-mass of disintegrated elements of the original Gulf of Gibraltar mass.

By their more or less sporadic appearance among masses of observations of appreciably lower denomination—Figure 20 for the Faroe Bank to Butt of Lewis section of May-June 1935 furnishes a good example—it seems fairly obvious that the minimum salinity which is significant of Gulf of Gibraltar water in the Faroe-Shetland Channel region is about 35·50‰, and it is of interest to note that Cooper and Vaux (1949) reached a similar conclusion in regard to the recognition of Gulf of Gibraltar water in the region of the Celtic Sea farther south. The recognition enables the following extensions to be made by inference as to the duration of an influence which clearly partakes of the nature of long-term or climatic change in the sea.

These extraordinarily high Scottish salinity observations, although not their true significance, were first noticed among the records of the year 1931 pertaining to the northern part of the North Sea (Tait, 1935). In point of fact a further scrutiny of the records discloses, by the above standard, three such observations in the previous year, not in the North Sea, nor yet in the Faroe-Shetland Channel, but more or less immediately south of the latter region in the waters off the western isles of Scotland. These observations were, 35·52‰ at 174 metres depth at 56°17′N 9°10′W, on 25 August 1930, and 35·50‰ at 200 metres and again at 250 metres in the position 58°26′N 8°04½′W, on 28 August 1930.

The inference may reasonably be made from these observations and their geographical and vertical locations that they probably marked the beginning of a nearer approach of Gulf of Gibraltar water towards the Faroe-Shetland Channel region, which progressively increased in intensity and northerly attainment during the following three or four years, in course of which the incursion passed into and through the Faroe-Shetland Channel and down into the northern North Sea. The peak of the incursion seems to have been reached in either or both of the years 1933 and 1934, the evidence of Faroe-Shetland Channel observations favouring the former year, but that of northern North Sea records, the latter.

In the waning phase of the Gulf of Gibraltar influence, which seems to have been relatively rapid after 1934, Faroe-Shetland Channel observations failed to disclose any trace of it in the year 1937, but in that year other three records among the Scottish material are significant. On 15 April 1937, at 40 metres depth in the position 56°50′N 9°02′W, about 60 miles south-south-west of St. Kilda Island, the salinity of 35·73‰ was registered. On 1 July, at the northern entrance to the North Sea (61°01′N 0°10′W), 35·54‰ salinity was recorded at a depth of 100 metres, and finally, at 59°12′N 2°13′W within the north-western approaches to the North Sea, in the eastern neighbourhood of the Orkney Islands, 35·52‰ was logged at 60 metres depth on 18 August 1937. These observations serve to maintain the continuity of the phenomenon to the final Faroe-Shetland Channel evidence of only three observations in 1938. One of these, the highest (35·64‰), was recorded at 80 metres on 28 July at a position (60°44′N 2°09′W) which was not on either of the two sections overtaken across the Channel in the beginning of the same month. Again, however, between the months of May and August inclusive in 1938, there were recorded no fewer than ten further observations ranging from 35·50‰ to 35·78‰ through 35·54‰, 35·58‰ and 35·69‰, in depths from 20 to 400 metres in the nearer North-Eastern Atlantic Ocean waters west of Scotland to longitude 14°30′W (except in one case which referred to a position on longitude 18°W, and one additional surface observation of 35·64‰ in the middle of the northern North Sea (57°58′N 1°35′E), probably on the boundary of the Great Northern North Sea Eddy (Tait, 1937)).

Lastly, two records belonging to the year 1939 fall to be noticed in this connection as probably marking the departure for a period of years of any substantial Gulf of Gibraltar water influence in the regions mainly concerned in this examination, for, as will be seen below, more intensive operations in the fifth, and the beginning of the sixth, decades of the present century in these regions have failed to reveal any but the most infrequent and sporadic records indicative of the phenomenon. On 14 May 1939, some 45 miles west of the Butt of Lewis (58°34′N 7°49′W), the observation of 35·52‰ salinity was made at 30 metres depth, and three months later, on 18 August, within the North Sea eastward of Shetland (60°01′N 0°20′W), bottom water at 125 metres beneath the surface had a salinity of 35·50‰.

In view of certain recommendations of a restrictive nature which, from an operationally economic standpoint, have been advanced more or less powerfully in recent years as regards future practice by research vessels in physical oceanography, it may here be pointed out in parenthesis how greatly the above elucidation and interpretation of a long-term phenomenon which cannot be without import in contingent oceanographical investigation and which was contained, so to speak, within another larger-scale phenomenon, has depended upon systematic and intensive collection of observations at sea, as well as very materially upon the accuracy of these observations. It would be easy to recommend with almost complete assurance, ways and means of improving such elucidation and interpretation of marine physical phenomena. It is difficult, on the other hand, to appreciate how otherwise than by adequate and accurate observation it would have been practicable, or even possible, to trace with similar or greater confidence the phenomenon whose approach was apparently signalised in 1930 off western Scottish shores, to trace its development as it waxed to maximum intensity and spatial influence towards the middle of the period, and waned again to almost negligible proportions nine years later. On this evidence of its liability to be present in northern fishery regions apparently in more or less systematically varying degree over a number of years, contributing its distinctive physical, chemical (Thomsen, 1931; Sverdrup, Johnson and Fleming, 1942, p. 245) and biological (Fraser, 1955) characters, the Gulf of Gibraltar water-mass must obviously be taken into account in fisheries research pertaining to these regions.

Heavy Oceanic Water

Another factual and, by former standards, somewhat radical outcome of the foregoing survey of temperature and salinity distributions in the Faroe-Shetland Channel, is the demonstration of the existence on occasions of heavy, sub-zero temperature, oceanic water, that is, water of salinity greater than 34·99‰. Only one such instance seems ever before to have been cited in the literature, namely, that by Robertson (1913). Since this was only a single instance—although he recorded other approaches to it, all from the Faroe-Shetland Channel—Robertson legitimately doubted its reality and offered no explanation of it. The instance in question was of a salinity observation of 35·08‰ in association with a temperature of −0·98°C (σ_t=28·24) registered at 1200 metres depth at the position 61°18′N 2°59′W on 26 April 1909.

Once again, however, in this investigation, a fortuitously timeous series of observations in the vertical column of one of the stations on the Faroe to Shetland section of May 1929 (Figure 10), furnishes the direct clue to the manner in which heavy oceanic water is physically derived in the Faroe-Shetland Channel without, as presupposed by Helland-Hansen and Nansen (1909, p. 85) from an example in the Barents Sea, the contingent formation of ice.

Leaving turbulence out of account, heat transference in the sea, by conduction and convection, is understandably a more rapid process than can be the transference of salt, which must be by diffusion. In an approximation to steady conditions in the sea, therefore, one end, say, of a level in a layer of water of uniform salinity, which by the nearer proximity of colder water is more rapidly reduced in temperature than the other end, must immediately tend to sink, and the sinking will be the more rapid, with the smaller chance therefore of induced salinity change, the greater is the vertical temperature gradient through which the cooling water body passes in obedience to its increasing density. Such a process seems just to have been "caught" in Figure 10 as a falling—or, to use Cooper and Vaux's (1949) term, cascading—body of water. Starting from a higher level on the south-eastern slope of the Faroe Islands shelf, this has rolled down the slope, cooling with increasing rapidity on the way, until, by near contact with sub-zero temperature bottom Norwegian Sea water, it is, by its greatly increased density, about to separate completely from the oceanic water-mass and continue its course, its salinity relatively unchanged in the nature of the movement, to the bottom of the submarine valley which is the Faroe-Shetland Channel proper. Here, on occasions, as in June 1933 (Figure 15), it is in fact encountered. Other instances of similar antecedent process probably account for the heavy, relatively isolated, oceanic water bodies illustrated also in (i) Figure 11 in the deepest waters on either side the Wyville Thomson Ridge at the end of May 1929, as well as, at the same time, at a higher level on the southern slope of the Ridge, (ii) in Figure 14 (May 1931) between the Ridge and Faroe Bank, (iii) in Figure 25 (May 1937) between the Ridge and the continental slope, and (iv) in two instances in Figure 28 for July 1938, one near the foot of the Faroe shelf slope in relatively substantial quantity it would appear, and the other in much smaller bulk, on the opposite slope of the continental shelf at approximately the same depth. These instances, eleven in all, are clearly too frequent merely to set aside because of their abnormality as in some inexplicable way erroneous, for in only one case was the salinity value an unconfirmed figure by at least duplicate analytical determination, and in no case was there any apparent reason to doubt the accuracy of the thermometer reading.

HORIZONTAL VORTEX OR TORTIONAL CURRENTS

On the contemporary pair of cross-Channel sections of May 1931 (Figures 13, 14), the suggestion of another phenomenon in water-movement in the upper waters of the Channel seems implicit in the relative positions at the same level (100 metres) on the two sections of a high salinity nucleus, and in the consequent, closely similar neighbouring conditions, especially of salinity, around the respective nuclei. There is also represented on Figure 14 an apparently related and meaningful loop in the 9°C isotherm around the nucleus of the southern section. The suggestion is that of a tortional current northward through the oceanic water-mass, thus physically connecting the two nuclei. That of the southern section, at 35·64‰ maximum salinity, is immediately indicative of Gulf of Gibraltar water. Its envelopment in a movement such as that suggested could account for its maintenance of horizontal level despite the vertical instability which its density (σ_t) of 27·62, between 27·41 at 80 metres and 27·37 at 200 metres, manifestly entailed. The maximum salinity of the northern nucleus on the other hand, namely 35·46‰, does not at once carry the implication of Gulf of Gibraltar origin, but its density (σ_t) of 27·72, not involving vertical instability in this instance, is within the density bracket cited by Sverdrup, Johnson, and Fleming (1942, p. 670) as characteristic of the intermediate layer of Gulf of Gibraltar (or Mediterranean) water in the North-Eastern Atlantic Ocean. So that this nucleus probably represented still a relic of Gulf of Gibraltar water, depreciated in character in the suggested tortional movement by which it attained its position on the northern section from the southern one.

TEMPERATURE OF THE ATLANTIC CURRENT

Regarding the temperatures of the oceanic water-mass there is little of particular note to be mentioned which cannot better be appreciated from inspection of the diagrams. Maximum temperature is apparently not always registered within the core of the Atlantic Current. It is usually of somewhat greater magnitude on the southern than on the northern contemporary section, the difference being of the order of about 1°C or 2°C. In the month of May, the maximum temperature of the northern section is ordinarily between 9°C and 10°C, and on the southern section, between about 10·5°C and 11·5°C. In June these registrations have stepped up to between 10°C and about 12°C on the northern section and between nearly 10·75°C and slightly over 13°C in the region of the Wyville Thomson Ridge. Frequently, the 9°C isotherm, after running nearly level along the greater part of either section from the north-west, is found to dip steeply towards the continental slope. The base of the oceanic water-mass as defined by the 35·00‰ isohaline is normally found to lie in approximately parallel relationship with either the 3°C or the 4°C isotherm, although on occasion, in at least part of its situation, it may be found to have closer association with the 5°C, or, on the other hand, with the 2°C, isotherm.

THE DEEP CHANNEL WATERS

The deep waters of the Faroe-Shetland Channel present other features which do not seem hitherto to have been sufficiently appreciated. Just as for the better realisation of significant change in the character of the oceanic water-mass, it has been advantageous to delineate salinity change in successive steps of 0·05‰, the same procedure equally suits the study of the bottom water-masses of the Channel, elucidating the small but apparently significant changes which take place also at these levels over periods of time which appear usually to involve at least several years.

Prior to this investigation, studies of the Faroe-Shetland Channel region from which the most comprehensive and fundamental information has been gathered were those of Robertson (1905, 1907, 1909, and 1913) referring to the years 1903 to 1910 inclusive, which studies were initiated by Helland-Hansen (1905) in the year 1902. The conception from these early researches as regards the bottom waters of the Faroe-Shetland Channel, is that these normally and essentially comprise waters derived from the depths of the Norwegian Sea below about 800 metres, mixed on occasions with Arctic water withdrawn from the East Icelandic Arctic Current. Helland-Hansen and Nansen (1909) have defined the characteristic salinity of this bottom Norwegian Sea water, mostly of sub-zero temperature, as 34·92‰, with variation approximately between 34·90‰ and 34·94‰ or 34·95‰, indicating admixture in relatively minor degree with Arctic water on the one hand and with oceanic water on the other. That being so, and the accuracy of salinity determination being accepted as within ±0·02‰—although experience now indicates that the accuracy may indeed be almost within 0·01‰ in most cases—it is reasonable to look upon salinity variation of greater than ±0·04‰ as of at least geophysical significance, probably indicative of distinctive origins, geographically, of the waters concerned. Among Robertson's tabulated observations, particularly those relating to the year 1908 in the Faroe-Shetland Channel, are several entries of salinity between 34·76‰ and 34·89‰, but, apart from general reference to the probability of their derivation from Arctic sources, through the Norwegian Sea, no particular attention was directed to them when they occurred, or to their absence in certain years.

In the first of the sections dealt with in the present report, namely that from about the Island of Syderø, Faroe, towards Fair Isle in August 1927, only one station reached to the deepest part of the Channel, but below 800 metres on that station the salinity of the water was uniform at 34·85‰. At 500 metres it was only 34·87‰, and at 650 metres on the adjacent continental slope, 34·88‰; so that it would appear as if in August 1927 the entire deep water-mass of the Faroe-Shetland Channel was not of bottom Norwegian Sea water, but essentially Arctic water—an Arctic water-mass in fact—from the East Icelandic Arctic Current, probably from that part of it which Helland-Hansen and Nansen (1909, p. 293) cite as constantly to be found as an intermediate layer along the northern slope of the Faroe-Iceland Ridge. Bottom Norwegian Sea water, on this occasion, was evidently sandwiched between oceanic and Arctic water-masses. Figure 9, by a minimum salinity of 34·89‰ in the deep region between the Wyville Thomson Ridge and Faroe Bank, implies the southerly extension of the above Arctic water-mass into the toe of the Channel in the month of August 1927.

About mid-May 1929 (Figure 10), Arctic water of slightly lesser minimum salinity again entirely displaced bottom Norwegian Sea water from the deepest levels (below 500-600 metres except against the continental slope) of the northern section between Syderø and Papa Stour, west Shetland. This time, evidence of its presence between Faroe Bank and the Wyville Thomson Ridge towards the end of the month was lacking—perhaps due to an insufficiency of observations—but less than one month later it had apparently disappeared also from the northern part of the Channel between Shetland and Faroe when only bottom Norwegian Sea water was found. Moreover, it already begins to be apparent, as is implicit also in Robertson's data, that the true bottom Norwegian Sea water is mostly of a lower minimum temperature (−0·98°C in June 1929) than that of the Arctic water-mass (−0·81°C in August 1927, −0·91°C in May 1929).

The remarkable observation falls now to be made that, apart from a singular, isolated, 34·87‰ salinity record in July 1934, *no further trace of the Arctic water-mass was found* in the deep Faroe-Shetland Channel throughout the fourth decade, which does not mean, however, that the investigations of 1931 to 1939 inclusive revealed bottom waters of uniform salinity throughout, according to the standard adopted. From 1931 to 1934 inclusive they do appear to have been so, recording salinity of between 34·90‰ and 34·95‰, but in Figure 21, that for the northern section of June 1935, the bulk of the bottom water below 400 metres is represented as of a uniform salinity of between 34·96‰ and 34·99‰. Only a small, but nevertheless substantial, cross-sectional area appeared as true bottom Norwegian Sea water of salinity below 34·95‰. The higher salinity bulk mass might, it is suggested, suitably be designated sub-oceanic water.

Still more peculiar conditions of a similar kind are illustrated on Figure 28, representing the Faroe to Shetland cross-section of the first week of July 1938. In this diagram true bottom Norwegian Sea water appears somewhat as an intrusion into a bulk bottom water-mass of sub-oceanic water, which cushions against the Faroe shelf slope and again against the continental slope, two of those bodies of heavy oceanic water which have already been described. The impression of the diagram as a whole is one of intense turbulence, especially in the deeper water-masses.

The three cross-sections for June and July 1939 (Figures 29, 30, 31), witness a return to the situation of the bottom Norwegian Sea water-mass as exclusively the deep water-mass of the Channel. As will be seen presently the post-war continuation of these investigations has produced still other interesting features in regard to the deep waters of the Faroe-Shetland Channel.

Sectional Distributions of Temperature and Salinity, 1946-1952

1946

Nolsø, Faroe—Flugga, Shetland.

(a) *20-21 July 1946*,(6 stations), F.R.S. *Explorer*. Figure 32a.

(b) *26-27 August 1946*, (9 stations), R/V *Dana*. Figure 33.

(c) *10 October 1946*, (3 stations), F.R.S. *Explorer*. Figure 32b.

In addition to the *Dana* hydrographic section of 26-27 August 1946, between Shetland and Faroe, which has already been cited in the hydrodynamical part of this report, there are also available in the year under review two parts of the same section worked by *Explorer* in July and October respectively. Although these two parts comprise, in the one case little more than one half and, in the other, scarcely one-third of the complete section, they include in both cases the core of the Atlantic Current through the Channel, and the chronological comparison of the three sectional diagrams affords certain information which is enhanced in its significance by the results of subsequent years' operations in the same region. The intervals between the three series of operations were five weeks and six and a half weeks respectively.

Maximum temperature occurred in the surface water on all three sections, either at the station nearest to, or nearest but one to, Shetland. The respective values were, in July 13·26°C, in August 12·97°C, and in October 11·41°C. It is at once to be noticed that, at the depth of 100 metres, the opposite tendency of rising temperature was recorded from July to October, the values at this depth increasing from between 8½°C and 10°C in July-August, to between about 9½°C and 11¼°C in October.

The above maximum temperatures were on none of the three occasions directly associated with the maximum salinity recorded. In July there was a maximum nuclear salinity of 35·37‰ between the depths of 50 metres and 150 metres on the second station out from Shetland, immediately over the edge of the continental shelf. This high salinity nucleus was in the same position and at practically the same depth five weeks later, but its value had increased to 35·41‰, and the same maximum value was recorded at a greater depth (180 metres) on the same station on 10 October 1946. In all three months the core of the Atlantic Current was probably defined by the 35·30‰ isohaline, or isohalines, with, in each case, a small inner core within the 35·35‰ isohaline.

The above circumstances, save for the diminishing maximum surface temperature, are indicative of increasing intensity of the oceanic influence in the Channel between July and October 1946. The diminishing surface temperatures in the same period were almost certainly connected with a freshening influence in the uppermost waters which was signified by an appreciable and, at four stations, marked, decline in salinity between July and August 1946. This freshening influence undoubtedly emanated from the Norwegian Sea, and was probably connected at long range with the East Icelandic Arctic Current, further evidence of whose influence in the Faroe-Shetland Channel in the summer of 1946 is contained in the two following salinity records.

The half-section of July (Figure 32a) included, within the bottom Norwegian Sea water-mass underlying the Atlantic Current, a single minimum salinity of 34·89‰ at 600 metres depth in about mid-Channel. In August 1946 (Figure 33), the value of 34·88‰, again singular, was recorded at 400 metres at the neighbouring station south-eastward on the section.

From the foregoing investigations relative to 1927-1939, these minimum values of 1946 may be taken to represent slight East Icelandic Arctic Current influence in the Channel, possibly also reflected in the above-mentioned lowering between July and August of the salinity of the uppermost water layer on the southern half of the section between Faroe and Shetland.

It would thus appear that from the summer to the autumn of the year under review there was inincreasing Atlantic influence in the Faroe-Shetland Channel. This inference is indirectly supported from another source. Surface drift-bottle liberations in the northern North Sea and the nearer reaches of the Faroe-Shetland Channel from June onwards in 1946 resulted in a concentration of recoveries in the Norwegian Sea latitudes of the Norwegian Coast in the subsequent months of October and November (Tait, 1948). Such concentrations in these latitudes are normally associated with increased intensity of the Atlantic Current in and through the Faroe-Shetland Channel to the Norwegian Sea. It seems, therefore, that following a comparatively low intensity in August, the Atlantic Current strengthened in the autumn of 1946. As has been demonstrated dynamically, this feature of autumnal accession to the strength of the Atlantic Current was very evident in the years from 1949 to 1952, when observational material for the season involved was adequately available. It begins to appear as if this might be an annual phenomenon over at least a group of consecutive years.

As already indicated the bottom water of the Channel in the summer of 1946 was, certainly in the month of August, entirely of bottom Norwegian Sea water, with remarkably uniform salinity of 34·90‰ to 34·94‰, and minimum temperature of —0·83°C.

1947

Nolsø, Faroe—Flugga, Shetland. 10-12 June 1947. Figure 34.

In this summer, apparently in this particular month of 1947, of very high intensity of the Atlantic Current according to Table 1, the nucleus of the Current, enclosing maximum nuclear salinity of 35·42‰, extended in elongated cross-section from about 100 metres sub-surface, to at least 400 metres depth. Even the core of the Current, regarded as bounded by the 35·35‰ isohaline, failed to reach within 60 metres of the sea surface in its normal position on the section against the continental edge and the upper levels above about 450 metres of the slope below. Freshening influence in the uppermost waters was not, however, strongly marked, salinity in the surface layer scarcely falling below 35·30‰, except near Shetland and in the easter vicinity of the Faroe Isalnds.

It is implicit in the comparatively great depth—over 500 metres to a maximum of no less than 700 metres—of the major part of the 35·00‰ isohaline on Figure 34, that a very considerable body of the oceanic water-mass was present on the section in June 1947, and, by the marked undulation of this isotherm, was probably forcing a strong passage through the section at the expense of the underlying water-masses, for as Figure 34 reveals, there were two such masses, both, although heavier, apparently having to give way to some extent before the oceanic water-mass.

It would appear when this section was taken as if the normal bottom Norwegian Sea water of the Channel, with a salinity between 34·91‰ and 34·94‰, was being displaced on its south-eastern side along the lower slopes of the continental shelf, by a substantial influx of East Icelandic Arctic water with salinity of 34·87‰ to 34·89‰. A smaller portion of the same water-mass appeared also against the upper slopes of the Faroe shelf, cut off apparently by the down-bearing wedge of oceanic water into the bottom Norwegian Sea mass, the minimum temperature of which, incidentally, at —0·72°C, was very much lower than that (—0·31°C) of the Arctic water-mass.

It is perhaps material at this stage to recall that only traces of the Arctic water-mass were located on the same section in the previous summer, and that it was entirely absent from the Faroe-Shetland Channel throughout the summers of the 1930's, its last recorded appearance being in 1929.

The maximum temperature of the June 1947 section, namely 12·24°C, was registered on the surface outwith the 35·35‰ core of the Atlantic Current.

Faroe Bank—Butt of Lewis. 18-19 June 1947. Figure 35.

It is not improbable, as within the limits of error in the salinity determinations, that the salinity observations at 200 metres and 300 metres at the position 59°17′N 6°53′W on this section were actually slightly greater than as recorded, namely 35·39‰, thus giving, as suggested on Figure 35, the nucleus of the Atlantic Current around a maximum recorded salinity of 35·41‰ at 100 metres, a similarly elongated shape in cross-section on this southern section as that represented on Figure 34 on the contemporary northern section. The two nuclei were of the same salinity and on corresponding parts of the respective sections. On the southern section, however, another nucleus round a maximum salinity of 35·43‰, occurred, again at 100 metres depth, in the north-western half of the section and, reverting again to the northern section, this had its counterpart there also in a correspondingly placed secondary nucleus of maximum salinity, 35·39‰.

In point of fact still another, higher maximum salinity nucleus of 35·45‰ was recorded on this southern section of June 1947 at 40 metres depth at the position, 59°00′N 6°40′W.

Fresher water from west Scottish coastal regions is evident in Figure 35 near the Butt of Lewis.

Owing to obviously premature operation of a series of three reversing water-bottles, observations are not available for the deep levels at the only station on the section between the Wyville Thomson Ridge and Faroe Bank. It would have been of interest to know whether the Arctic water-mass delineated on the Faroe to Shetland section (Figure 34) of the week before had attained to the northern slope of the Ridge.

Maximum temperature on the southern section was 12·06°C, recorded on the surface immediately above the continental edge and outside the Atlantic Current core, in water of salinity 35·16‰.

The slight minimum and maximum salinity nuclei in the same water column almost atop of the Wyville Thomson Ridge, may in fact be more apparent than real, the recorded values in relation to 35·35‰ being within the limits of experimental error.

Nolsø, Faroe—Flugga, Shetland. 19-20 July 1947. R/V *Dana*, Figure 36.

Taken more than five weeks after the *Explorer* section over the same route, the above *Dana* section shows considerable differences from the earlier one.

In the interval, maximum temperature on the section rose from about 12¼°C to almost 15°C on the surface in mid-section. There was, however, on the *Dana* section, a rapid fall in temperature to 9°C within the uppermost 50-metre layer over the greater part of the section. The remaining isotherms also, to zero, lay appreciably higher in the later section.

Maximum nuclear salinity remained at 35·41‰, but the nucleus and the core of the Atlantic Current within the 35·35‰ isohalines was very much restricted in cross-sectional area on the later section. In the uppermost 200 metres generally along the section salinity had fallen on the average by 0·05‰. The indication, however, was more material on the July section in this upper layer, of two distinct bodies of oceanic water, similar in salinity, one occupying the western and the other the eastern part of the section and separated by distinctly fresher water of salinity mainly between 35·21‰ and 35·26‰. This freshening influence, by the uppermost water salinities all the way from mid-section to Faroe, clearly came from the north and north-west.

The higher average levels of corresponding isotherms and isohalines on the section in July as compared with June, suggest a weakening of the northerly directed oceanic water-mass, and hydrodynamical results, as has been seen, confirm the suggestion.

Surprisingly, there is no evidence on the *Dana* section of the Arctic water-mass which was such a marked feature of the section five weeks before. In July 1947 the entire bottom water-mass of the Channel seems to have been bottom Norwegian Sea water with a minimum temperature of —0·85°C. On 15 August 1947, however, *Explorer*, at the position latitude 60°15′N, longitude 6°00′W, over the deepest part of the Faroe-Shetland Channel, recorded salinites of 34·86‰ and 34·87‰ at 800 metres and 1000 metres respectively, the former value being the lowest so far recorded in these investigations. The minimum temperature associated with these observations was —0·67°C.

1948

Besides the standard pair of sections by *Explorer* in the first ten days of May 1948, *Dana* accomplished a section from Faroe Bank across the Wyville Thomson Ridge to Sulisker Bank on the continental shelf north-east of the Butt of Lewis towards the middle of June and, in August, covered the normal Faroe to Shetland section of eleven stations.

Faroe Bank—Butt of Lewis. 3-4 May 1948. Figure 37.

The great mass of water on this section, from a few miles south-east of Faroe Bank almost to the Butt of Lewis, registered salinity in excess of 35·35‰ and temperature of from about 8°C to over 9·5°C. The core of this oceanic water-mass, extending from the surface to bottom on the continental edge and the upper levels of the continental slope, may be taken to have been defined by the 35·40‰ isohalines. Within this core there was a small nucleus centred on a singular salinity value of 35·56‰ at 30 metres depth off the continental edge, a value which, by the results of the pre-war investigations, it seems legitimate to accept as indicative of Gulf of Gibraltar water intrusion into the oceanic water-mass.

Maximum temperature on the May 1948 section, of 9·77°C, lay on the surface immediately over the maximum salinity (Gulf of Gibraltar water) nucleus.

On the north side of the Wyville Thomson Ridge both temperature and salinity diminished rapidly between about 450 and 650 metres, from 8°C to 2°C and from 35·35‰ to less than 35·05‰ respectively. In the deepest sounding between the Ridge and Faroe Bank, namely at 880 metres, a further example was encountered of those heavy, sub-zero temperature, oceanic water bodies which, on a number of occasions in the fourth decade, were found either in this same deep valley, or on the other, southern, side of the Ridge, the combination on this occasion being, as shown on Figure 37, a temperature of −0·45°C, with salinity of 35·01‰. Lack of observations between 600 metres and this deepest sounding may obscure the presence of an intervening mass of bottom Norwegian Sea water between the Ridge and Faroe Bank.

Nolsø, Faroe—Flugga, Shetland. 8-10 May 1948. Figure 38.

So nearly contemporaneous with the above section over the Wyville Thomson Ridge, the Faroe-Shetland section of 8-10 May 1948 shows surprisingly little correspondence in its temperature-salinity distribution with the earlier traverse. Salinity nowhere exceeded 35·37‰ between Shetland and Faroe and the core of the Atlantic Current is there represented cross-sectionally (Figure 38) by the area between the 35·35‰ isohaline and the bottom contour of the continental shelf from its edge to Shetland, this area also being comparatively more restricted and very much shallower than the corresponding area of the southern section between the 35·40‰ isohalines. The associated isotherms also reveal a fall in temperature of the order of 1°C from south to north. Maximum temperature of 9·29°C west of Shetland compares with 9·77°C north-west of the Butt of Lewis.

It would appear, therefore, that in its course from the Wyville Thomson Ridge region towards the southern reaches of the Norwegian Sea in the first half of May 1948, the Atlantic water-mass lost fairly rapidly its threshold temperature and salinity on entering the Faroe-Shetland Channel.

It can be observed from Figure 38 that the oceanic water-mass of the uppermost 150 metres between Faroe and Shetland was divided about mid-section into two parts, a smaller and a larger, by a slightly freshening influence which the fall in temperature particularly, to nearly 7°C towards Faroe, indicates as having derived from the north, probably more or less remotely from the East Icelandic Arctic Current.

In the deep levels of the section, water of sub-zero temperature to −0·82°C was recorded below 600 metres depth, as is normally the case, the water-mass being entirely of bottom Norwegian Sea water of salinity 34·92‰ to 34·94‰.

Faroe Bank—Sulisker Bank. R/V *Dana*. 12-13 June 1948. Figure 39.

Compared with the diagram (Figure 37) for practically the same section overtaken by *Explorer* six weeks previously, Figure 39 shows certain substantial changes in the distribution of temperature and salinity in the interval. As is to be expected with the advance of the summer season the temperature of the uppermost 50-100 metre layer of the section had increased to a maximum of 11·64°C in mid-June as against 9·77°C early in May.

The main core of the Atlantic Current in June, however, was evidently defined by the 35·35‰ isohalines with nuclear salinity of 35·42‰-35·43‰ in a broad band about 50 metres deep from the surface in about mid-section, thus revealing an approximately similar diminution in salinity in this region from May to June as was found between the Wyville Thomson Ridge and the Faroe to Shetland regions from the beginning to nearly the middle of the month of May.

Again, a secondary core of Atlantic water, very much smaller in cross-sectional area than the main core above-mentioned, was located in mid-June over towards Faroe Bank, this core also having a nuclear salinity slightly over 35·40‰ (35·41‰). As was noticed on the Faroe-Shetland section of mid-May, the two parts of the oceanic water-mass on the southern section in June, were separated from each other by an incursion of cooler and somewhat fresher water which probably originated from the Norwegian Sea.

The salinity of the bottom water to the north of the Wyville Thomson Ridge in June 1948 lay entirely between 34·92‰ and 34·94‰, significant of bottom Norwegian Sea water. Its minimum temperature was recorded as —0·60°C.

As is usual, the bottom waters on the south side of the Wyville Thomson Ridge were of fairly uniform temperature, between 8·5°C and 8°95°C, and uniform salinity of 35·30‰ to 35·34‰.

Nolsø, Faroe—Flugga, Shetland. R/V *Dana.* 12-14 August 1948. Figure 40.

35·35‰ isohalines from surface to bottom, one on either side of the continental edge, again defined the core of the Atlantic Current to the north-west of Shetland in August 1948, maximum nuclear salinity being 35·41‰. The maximum temperature of the section, 12·14°C, was recorded on the surface within this core on this occasion. There was no evidence, however, on this fourth Faroe-Shetland Channel section of 1948, of the divided oceanic water-mass of the upper layers which has been noted on the previous three sections.

The bottom water-mass below 500-600 metres was, in the main, bottom Norwegian Sea water with salinity between 34·90‰ and 34·95‰ and minimum temperature of —0·94°C, but a single observation of 34·89‰ in 800 metres off the continental slope gave this slight indication of the probable proximity of Arctic water.

1949

The advent of an additional reserach vessel, F.R.S. *Scotia,* in 1949, enabled operations in the Faroe-Shetland Channel region to be intensified and extended, both geographically, to the north-west of Faroe Bank and northward of Faroe, and in time, particularly into autumn and early winter months as well as in the first quarter of the year. For the year under review, besides the standard pair of cross-sections in September and November (Figures 44, 45, 47, 48), earlier attempts to complete contemporary pairs of sections having failed on account of adverse weather, there were accomplished, nevertheless, one Faroe-Shetland section in early March (Figure 41), a section from the southmost point of Faroe to north-west Orkney at the end of July (Figure 43), one Faroe Bank to Butt of Lewis section in the last days of April and the first week of May (Figure 42), besides extensions to the Butt-Faroe Bank sections in May and September (Figures 42, 44), and three short sections of five or six stations due north of Faroe in March, July and September (Figure 46).

Nolsø, Faroe—Flugga, Shetland. 8-10 March 1949. Figure 41.

Apart from the appreciably lower salinity core of the Atlantic Current—within 35·30‰ isohalines to an indefinite maximum nuclear salinity of 35·34‰—in comparison with all the sections of the previous two years, and the very marked undulations of both isotherms and isohalines in the middle water levels of the section, the most noteworthy feature of Figure 41 is the occurrence of lower salinity values in the bottom waters than have so far in these investigations been recorded in the region*, falling to below even 34·80‰ in an extensive cross-sectional area of less than 34·85‰ salinity adjacent to and below the main bottom water-mass of obviously East Icelandic Arctic water with a salinity of 34·85‰ to 34·89‰. Both bottom Norwegian Sea water (34·90‰ to 34·94‰ salinity) and sub-oceanic water (34·95‰-34·99‰) were evidently sandwiched in very narrow bands one above the other across the whole width of the channel between about 300 and 600 metres, between the oceanic and East Icelandic Arctic water-masses. From their apparently very rare occurrence in the Channel region it seems reasonable to regard salinity observations below about 34·85‰ as significant of somewhat different origin from those superior, to 34·89‰, which have been considered in this report as deriving from an intermediate layer of East Icelandic Arctic water. From Helland-Hansen and Nansen's Figure 100 (1909, p. 292), it would seem that the lowest salinity water at the bottom of the Faroe-Shetland Channel in March 1949 derived from the uppermost waters of the East Icelandic Arctic Current considerably far to the eastward of the Icelandic coast, which in turn seems to carry an implication almost of Polar, or at least sub-Polar, origin of the waters concerned. A nearer inferential demonstration of their derivation, at all events from upper water layers due

*Similar values are, however, recorded by Robertson (1909*b*) in tables of observations from the Channel for June and August 1908.

north of Faroe, is provided, as will be shown below by one of the new, short, longitudinal sections laid into this region immediately before the section under review was accomplished. Meantime, it may be noted that this lowest salinity water in the Channel had a minimum temperature of —0·82°C, while that of the main intermediate Arctic water-mass as it will henceforth be referred to in this report, i.e., with salinity between 34·85‰ to 34·89‰, was only —0·70°C.

Laterally, there was very little diminution in salinity on the south side of the Atlantic Current towards Shetland, and an inconsiderable fall in temperature, except on the shallow bottom at the extreme southern end of the section, from the maximum temperature of 8·94°C recorded between 200 and 300 metres within the oceanic core. On the north side of the main Current on the other hand, salinity declined to 35·17‰ near Faroe where temperatures between 6·23°C and 6·52°C were recorded, suggestive of colder, fresher, influence intermingled with that part of the oceanic water-mass which attained the Channel region by way of the west and north of the Faroe Islands.

Viderø, Faroe—Northward on longitude 6°35′W, to latitude 63°30′ N. 6-7 March 1949. Figure 46a.

As mentioned elsewhere, the purpose of this short section was to traverse the above-cited part of the oceanic water-mass entering the Norwegian Sea by way of the west of Faroe. Regarding the 35·00‰ isohaline as defining the limit or boundary of the oceanic incursion, Figure 46a shows that the object was achieved within about 65 miles of the northmost point of Faroe, at about latitude 63°25′N.

At its deepest, the oceanic water on this section sounded approximately 360 metres on the northern slope of the Faroe shelf, almost exactly the same depth as was registered by the 35·00‰ isohaline on the eastern slope of the shelf some three days later on the Faroe-Shetland section.

Comparison has already been made (p. 35) between the intensities of the two parts of the oceanic influx into the Norwegian Sea in March 1949, showing that part which passed through the Faroe-Shetland Channel to have been of the order of four times the magnitude of the influx north of Faroe. The relative depths and cross-sectional areas of the Atlantic water-mass on the two sections would seem to bear out the hydrodynamic interpretation, as do the following differences in the character of the temperature and salinity distributions and values on the two sections.

North of the Faroe Islands the core of the Atlantic Current was of appreciably lower salinity than in the corresponding part of what may legitimately be termed the main Atlantic stream through the Faroe-Shetland Channel—namely, 35·25‰ to 35·29‰, as against 35·30‰ to 35·34‰. Its maximum temperature also, north of Faroe, at 7·66°C, compares with the maximum of 8·94°C in the Channel between Shetland and Faroe. So that, already, immediately north of Faroe, the oceanic water-mass had undergone appreciable dilution by colder and fresher water. The north of Faroe section, of course, reveals the immediate source of this dilution, namely, the East Icelandic Arctic Current, with which, along about latitude 63°25′N, the oceanic mass was contiguous from the surface to about 150 metres depth, and at greater depths over-rode this Arctic water-mass in only slight admixture at the interface with Norwegian Sea water. Of particular interest, as probably bearing directly upon the contemporary minimum salinity observations in the bottom water of the Faroe-Shetland Channel, are the observations of 34·78‰ recorded at 300 metres about the middle of the short section, and of 34·77‰ observed at 150 metres at the outermost station.

Minimum temperature on the two sections also corresponded almost exactly at —0·81°C and —0·82°C respectively. There can be no doubt in fact of the identity of the deep water-masses on the two sections north and south-east of Faroe respectively, which, apart from the above-mentioned temperature and salinity minima, agree also in their bulk salinities of between 34·86‰ and 34·89‰.

Latitude 62°15′N, longitude 9°30′W—Faroe Bank—Butt of Lewis. 29-30 April, 7-8 May 1949. Figure 42.

This section was overtaken in two parts with an interval of one week between them. The temperature and salinity observations were taken in the normal way, as before explained, with the use of unprotected reversing thermometers as depth checks at all stations sounding more than about 100 fathoms.

Considering first the main theme of this investigation, namely, the oceanic water-mass, this, towards the end of April 1949, on the Faroe Bank-Butt of Lewis part of the section, presented an unusual picture, in contrast with all previous diagrams of this section. There was no well-defined high-salinity core, such as is usual, and no evidence of maximum nuclear salinity values. Maximum recorded salinity was, in fact, only 35·34‰, as on the early March section between Faroe and Shetland, but in comparison a very much greater cross-sectional area was included within the 35·30‰ isohalines, this area, however, being almost completely divided into two parts, extending from surface to bottom in each case, by a broad area of distinctly lower salinity water, between 35·25‰ and 35·29‰. The maximum temperature on the section was 9·48°C, scarcely more than 0·5°C higher than the corresponding quantity registered on the Faroe-Shetland section seven weeks previously, and, like it, recorded in subsurface water near the edge of the continental shelf.

On the other side of Faroe Bank, that is, to the north-west, the cross-sectional area of Atlantic water of 35·25‰-35·28‰ maximal salinity was also quite considerable and deep, but the fact of its lower salinity compared with that of the main Atlantic Current in the Faroe-Shetland Channel, and its lower temperature—fairly uniform at a little under 8°C in the mass—implies diluting influence, by colder water from the north, which no doubt contains the explanation also of the much smaller intensity northwards of the oceanic water-mass on this side of Faroe Bank and the Faroe Islands than through the Faroe-Shetland Channel. As already remarked, the section seems all but to have embraced, cross-sectionally, the entire oceanic water-mass tending towards the Norwegian Sea by this broad route.

The only direct evidence of bottom Norwegian Sea water north-west of Faroe Bank was contained in the temperature of −0·45°C and salinity 34·91‰ recorded at 800 metres between Faroe Bank and a lower unnamed bank a little way from it. Between the Faroe Bank and the Wyville Thomson Ridge, on the other hand, salinities of 34·84‰ to 34·82‰, with sub-zero temperatures to a minimum of −0·49°C, signified the presence of the same originally surface Arctic water as was first noticed on the March Faroe-Shetland section. As indicated on Figure 42, intermediate Arctic water with a salinity of 34·87‰-34·88‰ was also present in somewhat smaller bulk alongside it.

Munken Rock, Faroe—Hoy, Orkney. 30-31 July 1949. Figure 43.

Probably in accordance with the increased intensity of the Atlantic Current between early May and the end of July 1949, as hydrodynamically computed (Table 1), the section now under consideration revealed a distinct salinity core of the Current in excess of 35·35‰, as compared with a mean bulk salinity of scarcely above 35·30‰ seven weeks before. There was even the suggestion of a nucleus in the Current in the observation of a salinity of 35·40‰ at 100 metres depth towards the middle of the section north-west from Orkney. The maximum temperature of 14·41°C was recorded on the surface in the centre, almost, of a thin superficial layer of scarcely 25 metres in thickness which registered over 14°C in temperature. Immediately below this layer the fall in temperature was fairly rapid to 10°C, and slower thereafter to almost zero in the deepest part of the section where intermediate Arctic water was only just recorded at about 550 metres in a salinity of 34·87‰.

The strongly irregular form of the 35·20‰ isohaline in Figure 43, in the uppermost 150-metre layer on the edge of the Faroe shelf, is indicative of the contention in that region of neighbouring waters tending in opposite directions at relatively slow speeds, the water east of Faroe pushing southward and that over the deeper Channel off the shelf tending towards the north.

The convergence and intermingling, to some extent, of west Scottish coast waters with the Atlantic water-mass, is conveyed by the concentration and parallelism of the declining isohalines in the region west of Orkney in Figure 43.

Viderø, Faroe—Northward on longitude 6°35′W, to latitude 63°30′N. 21-22 July 1949. Figure 46b.

It is evident on comparing Figure 46b with Figure 43 that the core of the Atlantic stream north of Faroe was considerably less saline and about 1°C colder than that of the main contemporary Atlantic Current through the Faroe-Shetland Channel, indicating appreciable dilution and doubtless also a consequent impediment to its progress north to north-eastward in the Norwegian Sea, as has already been illustrated by the respective hydrodynamic computations. Figure 46b again reveals, as in the beginning of March 1949 on the same section, whence this dilution almost certainly proceeded, namely, from the East Icelandic Arctic water-mass underlying the oceanic mass in about 500 to 700 metres—substantially lower than in early March—and no doubt also contiguous with it in the upper layers beyond latitude 63°30′N.

Maximum temperature north of Faroe was 11·29°C which was more than 3°C less than the maximum in the Channel about one week later.

Latitude 62°02′N, longitude 9°18′W—Faroe Bank—Butt of Lewis. 3-5 September 1949. Figure 44.

In view of the striking difference recorded between the oceanic volume transports through this section in April-May and September 1949, the latter being at least double the former, considerable differences also in the characters of the waters on the section in these two periods might reasonably have been anticipated. Temperature, of course, in view of the difference in season, was considerably higher in the uppermost waters in September than four months previously, maximum temperature of 13·76°C in September comparing with 9·48°C at the close of the month of April. There was also, as might be expected in September, considerable thermal stratification of the uppermost 100 metres of water, a feature which was conspicuously absent at the end of April. On the other hand, the bulk of the water above 500 metres to 100 metres on the section in April, registering between 8°C and 9°C approximately, had, by September, risen in temperature by not more than 1°C and that in only about one-half of its bulk. In the deepest waters on the south side of the Wyville Thomson Ridge there was scarcely any perceptible difference in temperature from a little below to a little over 8°C as between the end of April and the beginning of September.

With regard to the salinity of the oceanic water-mass in these two periods, such very small difference in this character as can be appreciated, tended rather in the reverse direction to that which might reasonably be anticipated from the respective oceanic transports (see Table 1). It may be recalled that at the end of April the core of the Atlantic Current on the section under review, without any significant nucleus as is generally revealed, was signalised by a vertically and horizontally extensive cross-sectional area of water of salinity 35·30‰ to 35·34‰, extremely little of it apparently being at the maximum of this small range. Four months later, only two isolated nuclei of as much as 35·34‰ salinity, and one of just 35·30‰, appeared within a large body of water between the levels of about 50 metres and 575 metres on the south side of the Wyville Thomson Ridge, this large water-mass having a salinity range of only 35·25‰ to 35·29‰. This same salinity range, it may be recalled, characterised the apparently intrusive water-mass which in April divided from top to bottom the somewhat higher salinity (35·30‰-35·34‰) core of the Atlantic Current on this same section.

Looking now to the deep water on the north side of the Wyville Thomson Ridge, this, in September, showed practically the same minimum salinity as in April (34·82‰-34·83‰), but an appreciably lower minimum temperature of −0·71°C.

North-west of Faroe Bank, the same if not even greater diminution in the general salinity of the bulk of the oceanic water on this part of the section was evident in September as compared with April, as above discussed in connection with the main part of the section between Faroe Bank and the Butt of Lewis. Less cold but lower salinity water was found in the deep water immediately north of Faroe Bank in September than four months before, indicative of the displacement here of bottom Norwegian Sea water by the quondam surface Arctic water which has come as a new feature into these 1949 sections.

Nolsø, Faroe—Flugga, Shetland. 12-13 September 1949. Figure 45.

Somewhat in contrast to the above more southerly section athwart the Atlantic Current, the section now considered, taken from nine to ten days after the other, revealed a small but distinct core of the Atlantic Current with salinity in excess of 35·30‰ to 35·35‰ maximum nuclear salinity. This core, situated immediately over the continental edge and extending from about 25 metres below the surface to the bottom, was very much more restricted in cross-sectional area, although of the same salinity, as that shown on Figure 41 for the same section early in March 1949.

Maximum temperature in September, at 12·83°C in the surface over the core at 25 metres below, was here appreciably lower than that (13·76°C) of the Wyville Thomson Ridge section nine to ten days before, but there was similar thermal stratification, involving relatively rapid decline in temperature with depth, in the uppermost 100-metre layer as on the earlier more southerly section.

A minimum in oceanic salinity of 35·07‰-35·08‰, obviously indicative of fresher intrusion into the section from the north, was situated between 25 and 100 metres in mid-section, tending to divide the oceanic water-mass into two parts in a fashion which has already been noticed on several occasions in these investigations.

In the intermediate and deep waters of the section, Figures 41 and 45 for March and September 1949, respectively, bear some resemblance in the undulations of isotherms and isohalines, and afford certain points of comparison between the characters themselves of the water-masses occupying the section at these two periods separated by an interval of six months.

As indicated in Figure 41, the bottom water as a whole in March 1949, below the 34·90‰ isohaline, appeared to consist of two parts, distinguished by the 34·85‰ isohaline, the larger part with salinity greater than 34·85‰ probably emanating from the East Icelandic Arctic intermediate layer, and the lesser deeper mass with salinity below 34·85‰, to a minimum, then, of 34·79‰, being interpreted as of upper-water East Icelandic Arctic Current origin, in the first instance at all events.

On the September section, the bottom water was evidently subdivided into three parts by two separate 34·85‰ isohalines. Thus it would appear that one of the two bottom water-masses of the March section, namely, that of the lower temperature and salinity had, by September, greatly increased its extension over the section and itself become divided into two parts by the intrusion of the higher salinity intermediate Arctic water which, however, showed a distinctly lower minimum temperature in September (−0·92°C) than the water-mass which it divided. One of the parts of the divided water-mass, namely the larger part, included two minimum salinity nuclei of 34·78‰ and 34·79‰ respectively. The most striking feature of the other part, already referred to in the dynamical section of this report, was that it was apparently contiguous with the oceanic water-mass without any characteristic bottom Norwegian Sea water of salinity 34·90‰-34·94‰ intervening.

Viderø, Faroe—Northward on longitude 6°35′W, to latitude 63°18½′N. 7 September 1949. Figure 46(c).

For the third time in course of the year, the short section due north from Viderø, Faroe, on longitude 6°35′W, was run on 7 September 1949, and although foreshortened by two of the projected six stations, the representation which is possible from the data obtained of the temperature and salinity distribution north of Faroe along the steep slope of the Faroe submarine plateau, is included for comparative purposes as the third part of Figure. 46. There is little that need be said of this diagram beyond a passing reference to the evidence which it contains of turbulent reactions among the three typical water-masses which converge in that region, namely, the oceanic, East Icelandic Arctic, and Norwegian Sea waters. The section apparently did not extend sufficiently far northward to sample the low salinity East Icelandic Arctic water-mass, so substantial a part of which found its way south along the deep Faroe-Shetland Channel (Figure 45).

Faroe Bank—Butt of Lewis. 11-13 November 1949. Figure 47.

Comparing this with the same section two months earlier, it is evident that the oceanic water-mass approaching the Wyville Thomson Ridge had increased in salinity by approximately 0·05‰ between September and November 1949, notwithstanding that the maximum salinity recorded was the same in both months, namely 35·34‰. The cross-sectional area of water in excess of 35·25‰ in September, however, approximated more or less nearly to that of the 35·30‰+ water in November. Thus, the already noted increase (Table 1) in the intensity of the Atlantic Current between these two autumn months of 1949 receives support from these considerations.

The maximum temperature recorded in November namely 12·21°C at 20 metres depth some 20 miles off the Butt of Lewis, was approximately 1·5°C lower than the corresponding reading, 13·76°C, two months earlier. The only other feature of immediate note on the two sections was the apparent absence in November on the north side of the Wyville Thomson Ridge of the low salinity Arctic water (34·83‰) that was recorded there in September, although the temperature of this bottom water, at −0·86°C minimum in November, was 0·15°C lower than two months previously. It is, of course, possible that deeper observations than were practicable on account of weather conditions in the later month might have revealed similarly low salinity water (34·84‰-34·80‰) as was found on the section between Faroe and Shetland almost two weeks later.

Nolsø, Faroe—Flugga, Shetland. 22-24 November 1949. Figure 48.

This section presents some extraordinary features which indicate intense turbulent activity between the opposing forces of an increasingly strong Atlantic Current and the contrary-tending bottom water-masses wedging powerfully into the underside of the oceanic water-mass in about mid-Channel. The bulk of the latter on the northern section, as has been noted on previous occasions, seems again, in November 1949, to have been almost completely divided into two parts, each occupying approximately half of the section, by colder and fresher water influence deriving almost certainly from the East Icelandic Arctic Current at some distance to the north or north-west of the section. It is to be noticed how markedly this intrusive influence was reflected in the relatively lower salinity of the oceanic water-mass as a whole on the northern as compared with the southern section of November 1949, although the intensity of the Atlantic Current through the two sections as measured by volume transport computation was practically the same; and this same influence in the north may indeed contain the explanation of the discrepancy recorded in Table 1 between the maximum surface velocities of the Atlantic Current on the two sections. It may be noted that the temperature as well as the salinity of the uppermost 50-75 metres of water on the northern section were less in mid-Channel than near Faroe, arguing somewhat more direct East Icelandic Current influence in mid-Channel than around the Faroe Islands.

There was no well-defined core of the Atlantic Current apparent on the northern section of November 1949, although two maximum nuclear salinities appeared at the same level, namely 200 metres, on different parts of the section, one in either division of the bifurcated oceanic water-mass. That on the south-eastern half of the section, 35·34‰—note the apparent constancy, practically throughout 1949 (save for July), of the maximum oceanic salinity—has the appearance of being at the centre of a vortex with horizontal axis such as was suggested by similar nuclei correspondingly situated on the pair of sections of May 1931 (Figures 13, 14). The other maximum nuclear salinity (35·23‰) of Figure 48 may also, from its disposition relative to neighbouring isohalines, have been the centre of turbulent vortical motion.

The interpretation of rotary water-movement round the maximum nuclear salinity of 35·34‰ at 200 metres off the continental slope on Figure 48 is suggested by the cross-sectional disposition of the isohalines about this point. With this lead, or pointer, the closed 35·30‰ isohaline about the same maximum nuclear salinity at 300 metres on the southern section, traversed eleven days earlier (Figure 47), may bear a similar interpretation; and from the fact of the nuclear salinities being identical in magnitude, the presumption is at least permissible that they were physically connected by something in the nature of a tortional current.

The maximum temperature of this section, at 10·91°C, was recorded just above the sea floor at the south-eastern extremity of the section.

A remarkable feature of Figure 48, seldom encountered in such striking manner, is the almost rectangular intersection of isotherms and isohalines below about 300 metres.

The bottom water-mass of the section under review, in contrast to the apparent situation on the southern section between the Wyville Thomson Ridge and Faroe Bank twelve days before, did unmistakably register, in salinities of 34·80‰ to 34·84‰, the presence in bulk of the Arctic water-mass found on the same section in two distinct parts in September, although its minimum temperature in November (−0·76°C) was apparently somewhat higher than two months before (−0·89°C). The intermediate Arctic water-mass (34·85‰-34·89‰ salinity) which from about 400-450 metres reached to the bottom of the Channel in its deepest part in September (Figure 45), was, by November, along with the other Arctic, bottom Norwegian Sea, and sub-oceanic waters, sandwiched in an intermediate position between the uppermost oceanic and bottom-most Arctic masses.

The outstanding new feature of the hydrography of the Faroe-Shetland Channel during 1949 has thus been the influx of this low salinity Arctic water-mass into the deepest levels. There seems ample justification in the year's observations in comparison with those of former years to regard this low salinity water as of essentially different origin from that which almost certainly derives from Helland-Hansen and Nansen's intermediate East Icelandic Arctic layer on the northern slope of the Faroe-Icelandic Ridge. It seems justifiable to deduce from these authorities that the lower salinity Arctic water-mass (<34·85‰) originated in the uppermost layers of the East Icelandic Arctic Current possibly on or about its eastern boundary, and contained perhaps a relic of Polar, or at least sub-Polar, waters.

The relatively inferior salinity also of the core of the Atlantic Current, maintained apparently from March until November 1949, with only a slight indication of increase in July and notwithstanding something of the order of over one hundred per cent increase in the intensity of the Current in the interval, is further to be noted as probably distinguishing this from most other years.

1950

As in 1949, operations in the Faroe-Shetland Channel region in 1950 embraced, in single and contemporary paired cross-sections, of which three pairs were accomplished, the period of nine months between March and November inclusive.

In detail, the Butt of Lewis to Faroe Bank section was completed in March (Figure 49), May (Figure 50), June (Figure 53), July (Figure 56), and November (Figure 59), with extensions of the section northwestward beyond Faroe Bank in March and in May (Figures 49, 50). The Faroe to Shetland section was overtaken by Scottish research vessels in May (Figure 51), June (Figure 55), August (Figure 57), and, incompletely, in November (Figure 60). The Danish vessel *Dana* also did this section on the last day of May and the first day of June (Figure 52) and again in August (Figure 58). The short section due north of Faroe was accomplished in the months of March, May, and June (Figure 54).

Latitude 62°15′N, longitude 9°30′W—Faroe Bank—Butt of Lewis. 7-9 March 1950. Figure 49.

The core of the Atlantic Current within 35·30‰ isohalines and containing a maximum nuclear salinity of 35·37‰ over the continental shelf west of the Butt of Lewis, appears in two parts in the beginning of March 1950, one part confined practically to the continental shelf about its edge, and the other, probably as a result of turbulence, occupying in cross-section a considerable area between the depths of 250 and 550 metres off the continental slope. Further evidence for turbulence as the probable cause of this sub-division of the oceanic core is implicit in the occurrence, vertically above the deeper, isolated, part of the core, of a small region of minimum salinity, below 35·25‰, as shown on Figure 49. Maximum temperature of 9·34°C was associated with the oceanic incursion in its uppermost layer above the continental edge.

As has already been demonstrated by dynamic computation, the intensity of the oceanic influx into the Channel in the beginning of March 1950 was a strong one, and this would seem to be borne out by the apparent depths of the 35·00‰ isohaline and the zero isotherm between the Wyville Thomson Ridge and Faroe Bank, suggesting that the force of the oceanic water-mass was so strong as apparently to spill well over the Ridge down its northern slope.

To the north-west of Faroe Bank also, to the limit of the section, there was evidently present in March 1950 a considerable bulk of somewhat diluted oceanic water, dilution and appreciably lower temperature suggesting, as has previously been demonstrated quantitatively, the relatively minor role of this oceanic incursion towards the Norwegian Sea compared with that proceeding by way of the Faroe-Shetland Channel.

Figure 49 illustrates that there were no data for the bottom-most layer of water to the north of Faroe Bank and also for that between the Bank and the Wyville Thomson Ridge.

Viderø, Faroe—Northward on longitude 6°35′W, to latitude 63°30′N. 9-10 March 1950. Figure 54(a).

It seems clear from Figure 54a that, although lying to about 500 metres depth on the northern slope of the Faroe plateau, the amount of oceanic water on this section in March 1950 was relatively small and very much diluted. It was almost completely traversed by the section from Faroe to latitude 63°30′N. Hydrodynamical computation has confirmed the relatively small effective intensity of this marginal part of the main Atlantic Current in March 1950. Its temperature and salinity characteristics were also considerably inferior to those of the main current through the Faroe-Shetland Channel as can be seen by comparing Figures 54(a) and 49.

At the northmost station of the section on latitude 63°30′N, the approach to the East Icelandic Arctic Current was indicated by a rapid fall in surface temperature, and the subsurface decline in salinity to values below 34·80‰ at 200 metres depth.

Latitude 62°02′N, longitude 9°18′W—Faroe Bank—Butt of Lewis. 12-14 May 1950. Figure 50.

It is evident from Figure 50 that the Atlantic Current between Faroe Bank and the Butt of Lewis towards the middle of May 1950 was in two parts, one part, centred round two maximum salinity nuclei of 35·36‰ and 35·39‰ respectively, flowing between the Wyville Thomson Ridge and Faroe Bank, and the other, showing a maximum salinity of 35·35‰, between the Ridge and the Butt of Lewis. Maximum temperature in the Current was 11·20°C in the latter branch and just over 10°C in the former, both being surface values.

A maximum nuclear salinity of 35·39‰ appeared also at 100 metres depth—the same level as that at which this maximum was recorded south of the Faroe Bank—some twenty-five miles north-west of it, but the bulk of the oceanic water-mass on the north side of the Bank scarcely attained 35·30‰ salinity, indicating weaker intensity of the mass on this side than in the region of the Wyville Thomson Ridge, on both sides of which core salinities in excess of 35·30‰ were registered in substantial cross-sectional areas.

The effect of the Wyville Thomson Ridge in demarking the oceanic from the cold, fresh—minimum salinity 34·79‰—surface Arctic water-mass on the bottom of the Faroe-Shetland Channel proper is very evident in Figure 50. The minimum temperature of this bottom water in the toe of the Channel was −0·68°C.

Only sub-oceanic water (salinity 34·97‰) with positive temperature of 0·87°C was sampled in the deepest sounding (800 metres) north-west of Faroe Bank.

Nolsø, Faroe—Flugga, Shetland. 21-23 May 1950. Figure 51.

The core of the Atlantic Current, again delineated by the 35·30‰ isohaline, with a maximum nuclear salinity, however, of 35·41‰ at the surface, was in its usual position over the edge of the continental shelf north-west of Shetland towards the end of May 1950. Its maximum temperature of 9·23°C compares with 11·20°C on the southern section in the previous week. Together with the comparative restriction of the cross-sectional area included within the 35·30‰ isohaline on the northern section, this implies dilutive influence of the oceanic mass on the latter, notwithstanding its superior maximum salinity. This is confirmed by the sharp fall in temperature, and to a less extent in salinity, in the uppermost 50-150 metre layer in mid-section, tending thus to a division of the upper oceanic waters such as has been noticed on previous sections.

The bottom water-mass of the Channel was entirely, below about 450 metres for the most part, of the lower salinity (<34·85‰) Arctic water type, with, now, a substantial element of less than 34·80‰ salinity water to a new minimum record in these researches, of 34·77‰, practically the same value as the lowest of all recorded from the Channel region, namely, that of 34·76‰ listed by Robertson (1909b) in the month of August 1908. The minimum temperature of this new element at −0·83°C was appreciably below that, −0·74°C, of the bulk bottom water-mass of salinity between 34·80‰ and 34·85‰.

Viderø, Faroe—Northward on longitude 6°35′W, to latitude 63°30′N. 29-30 May 1950. Figure 54b.

On this short section of between sixty and seventy miles, the dispositions of the isotherms and isohalines in the uppermost 200 metres, particularly that of the 35·20‰ isohaline, are suggestive rather of lateral diffusive or eddy movements than of progressive mass-water-movement in either direction approximately normal to the section. The former type of movement might well be due to restrictive influence from the north exercised against the oncoming oceanic water-mass. This interpretation is apparently enhanced by the facts of distinctly lower upper water temperatures on this section than on the corresponding part of the Faroe-Shetland section one week before (Figure 51), and the very irregular vertical temperature-salinity distribution at the northmost station in latitude 63°30′N, where the oceanic water column, extending here down to 450 metres, was interrupted at only 100 metres depth by fresher water, and again at 300 metres by East Icelandic Arctic water. The latter also apparently exerted influence from below in the form of an upthrust into the base of the oceanic water-mass between 400 metres and 600 metres. Incidentally, the coincidence of the minimum temperature of this bottom water on the short section with that of the similar salinity bottom water-mass in the Faroe-Shetland Channel in the previous week, may be noted. The section, however, appears not to have extended sufficiently far north to include the lowest salinity Arctic water which was encountered in the Channel (see Figure 51).

Nolsø, Faroe—Flugga, Shetland. 31 May-1 June 1950. Figure 52.

This section by the Danish research vessel *Dana*, repeated, one week later, the same section done by *Scotia*. The temperature-salinity distributions on the two sections, in view of the short interval between them, show some remarkable differences, the most striking of which is the total disappearance, apparently, of the Arctic water-mass from the deepest waters of the later section, only bottom Norwegian Sea water of salinity 34·95‰ to 34·92‰ being registered by *Dana*. In view of the evident bulk of the former on the earlier section, this is most surprising, especially as the minimum temperatures, respectively —0·83°C and —0·86°C, of these bottom waters were practically identical.

The upper waters also apparently show scarcely less radical changes in their characteristics in the short interval of one week. Whereas, in the first traverse, the 35·00‰ isohaline at its highest point almost reached the 200 metres depth level, and scarcely projected below 400 metres at its maximum depth, in the second section this same isohaline lay entirely between the depths of 375 metres and 550 metres.

Both sections show, although at somewhat different parts of the section, an apparent upthrust into the base of the oceanic water-mass, of the Norwegian Sea water normally characteristic of the deeper layers of the Faroe-Shetland Channel, the upthrust being on the whole more pronounced, probably on account of the apparently strong intrusion of Arctic water below the Norwegian Sea water, in the earlier section.

The core of the Atlantic Current as defined by the 35·30‰ isohaline was considerably more extensive laterally on the later section, but instead of, as in the earlier one, embracing a superficial high salinity nucleus of 35·41‰, included, oppositely as it were, two small bodies of water of less than 35·30‰ salinity.

The maximum temperature of the *Dana* section was 9·53°C as compared with 9·23°C recorded at the adjacent station south-eastward by *Scotia*.

Generally, however, the higher temperatures and salinities recorded in the upper waters of the northwestern part particularly of the later section, as compared with one week previously, as well as the apparently complete absence of Arctic water from the bottom of the Channel by the end of May, point to an unusually rapid withdrawal, so far as experience to date indicates, of this cold and comparatively fresher influence from the north in opposition to the progress of the oceanic incursion.

Faroe Bank—Butt of Lewis. 16-17 June 1950. Figure 53.

Here again, in the bottom waters of the Faroe-Shetland Channel between the Wyville Thomson Ridge and Faroe Bank, although the minimum temperature of —0·80°C remained fairly near to those registered (—0·86°C and —0·83°C) two weeks and three weeks previously in the more northerly reaches of the Channel, no evidence is contained in the salinity observations of the presence of Arctic water which was so markedly characteristic of the Faroe-Shetland section in the beginning of the last week of May. Apparently only bottom Norwegian Sea water flooded the depths of the Channel throughout the month of June 1950.

The core of the Atlantic Current by mid-June on the southern section was well defined by the 35·35‰ isohalines and reached a maximum depth of not less than about 600 metres against the continental slope off the Butt of Lewis. The core contained two subsurface nuclei, in excess of 35·40‰ salinity to a maximum of 35·43‰. Both were centred in the same vertical column off the continental edge, one at about 50 metres depth and the other at approximately 200 metres. A slight, more or less superficial intrusion of fresher water was observed over the Wyville Thomson Ridge, and an isolated small body of similarly slightly fresher characteristics in the same vertical column, between 300 metres and 500 metres, indicates the probable turbulent effects there induced in the oceanic water-mass as, in its progress northward or north-eastward, it abutted on the southern slope of the Wyville Thomson Ridge.

The maximum temperature of the section, 10·99°C, was substantially higher than those (about 9½°C) recorded on the more northerly section two and three weeks before.

The above thermal and salinity increases are in step, so to speak, with the deductions to be made from the dynamics of the Atlantic Current as reported elsewhere (p. 43) in this volume.

Viderø, Faroe—Northward on longitude 6°35′W, to latitude 63°30′N. 19 June 1950. Figure 54(c).

For the third time in course of the spring-summer period of 1950, the short section due north of Faroe was overtaken on 19 June. As in the previous section towards the end of May, it would appear from Figure 54(c) that a more or less considerable part of the oceanic water-mass to the north of the Faroe Islands was not traversed by this same section some three weeks later. The bottom water upthrust into the base of the oceanic water-mass on the May section was more pronounced in June, reaching then to within 200 metres of the surface as against practically twice this depth three weeks before. In the deep waters of the section a considerably lower minimum temperature was recorded in June (−0·95°C) than in either of the two previous sections in March and May, the low minimum of June, however, belonging to the bottom Norwegian Sea type of water rather than to Arctic water. The former extended almost to the greatest depth of the June section alongside the Arctic water-mass, in contrast to the former dispositions of these two water-masses one above the other.

Nolsø, Faroe—Flugga, Shetland. 27-29 June 1950. Figure 55.

Nine days after the above short section, the standard hydrographic line of eleven stations between Faroe and Shetland (Figure 55) repeated, but in reverse, as it were, in the deep waters of the Channel, the above-mentioned vertical disposition north of Faroe of the bottom Norwegian Sea and Arctic water-masses, with, in the latter, scarcely such low salinity (34·88‰ as compared with 34·85‰) as was recorded on the more northerly section, and a slightly less (−0·90°C as against −0·95°C) minimum temperature than was there registered. Between Faroe and Shetland, however, the minimum temperature was associated distinctly with the Arctic water-mass of 34·88‰ salinity.

It may be recalled here that the same Faroe-Shetland section performed by the Danish research vessel *Dana* in the last day of May and the first day of June (Figure 52), revealed no Arctic water whatever in the deep layers, in marked contrast with the same section one week earlier (Figure 51). Nor on the *Scotia* section across the Wyville Thomson Ridge in the middle of June was any Arctic water found to occupy the deep region between the Ridge and Faroe Bank, as it did, in fact, in the middle of the previous month. Here it may be noted that this apparent disappearance for the time being of Arctic water from the lower layers of the Channel coincided with a period of maximum intensity of the Atlantic Current as found by dynamical measurement (see Figure 7).

Associated with the reappearance of the Arctic water-mass on the Faroe-Shetland section towards the end of June, was the raising of the 35·00× isohaline in its western part from between 400 metres and 500 metres at the end of May to between 275 metres and about 350 metres one month later, the position of the 35·20‰ isohaline being very similar on both sections. The relative disposition of the higher salinities on the two sections, including in the later one a nucleus of 35·41‰ which was absent in the beginning of June, as well as the appreciably higher temperatures later recorded in these waters, bear out the indication of the dynamics of the two sections to the effect that during the month the strength of the Atlantic Current through the Faroe-Shetland Channel probably increased, although, taking into account also the Faroe

Bank-Butt of Lewis section in the middle of the month (Figure 53), the closer interpretation of the dynamic figures is that the Current waxed in strength for about the first half of the month only and waned again somewhat during the second half (see Figure 7).

A maximum temperature of 11·72°C on 28 June, on the surface above the continental edge, marked the considerable rise of over 2°C in the interval of less than one month from the corresponding *Dana* figure of 9·53°C recorded at exactly the same position.

Faroe Bank—Butt of Lewis. 19-21 July 1950. Figure 56.

Salinities in excess of 35·35‰, such as defined the core of the Atlantic Current on the Faroe-Shetland section at the end of the month of June 1950, had entirely disappeared from the Wyville Thomson Ridge section by 19-21 July. At that time the core of the Current was contained within the 35·30‰ isohaline (maximum salinity 35·34‰), all of it subsurface and apparently depressed from the continental edge downwards on the slope to a maximum depth of 600 metres. This core also contained a slight minimum nuclear salinity of 35·29‰ at 200 metres.

A second nuclear subsurface salinity maximum of 35·34‰ occurred towards the northern end of the section off Faroe Bank between 100 and 200 metres.

Upper water temperatures continued to show the expected seasonal increase, and from under 12°C at the end of June rose to a maximum of 13·68°C in the uppermost waters by the third week of July.

A single salinity observation of 34·87‰ at 800 metres depth between the Wyville Thomson Ridge and Faroe Bank revealed the reappearance there also, from the previous occasion on which the section was crossed, namely, on 16-17 June, of Arctic water. The accompanying temperature observation of —0·51°C suggests that the Arctic water-mass was only just beginning to reappear here and had not had time when the section was taken to make its full influence felt thermally.

Nolsø, Faroe—Flugga, Shetland. 2-4 August 1950. Figure 57.

Although the 35·30‰ isohaline evidently still marked the subsurface core of the Atlantic Current on the continental edge west of Shetland in the first days of August 1950, a nuclear maximum salinity of 35·38‰ was included in this core at 75 metres depth, and still another apparent nucleus of 35·57‰ at 300 metres depth. The latter, by the standard evolved as a result of this investigation, is of course to be regarded as indicative of the presence of Gulf of Gibraltar water.

A tendency to division of the uppermost 200-metre layer of the oceanic water-mass, by fresher water intrusion, superficially, on the northern part of the section but more deeply also at about mid-section, is apparent on Figure 57, inducing a secondary core of oceanic water to form on the edge of the Faroe shelf.

Uppermost water temperatures had risen still further to 13·94°C maximum by the beginning of August, but, in comparison with the situation on the section at the end of June (Figure 55), Arctic water intrusion into the deeper water layers below about 400 metres had considerably strengthened, to the extent of almost excluding bottom Norwegian Sea water from depths greater than 600 metres, except for a narrow vertical strip, in cross-section, along the continental slope, where salinity of 34·92‰ was registered at least to 1000 metres and probably to nearly 1200 metres. Further, the minimum salinity of the Arctic water-mass had declined to 34·81‰, although its minimum temperature remained about the same at —0·88°C. A lower minimum temperature of —0·92°C was associated with the narrow band of bottom Norwegian Sea water against the continental slope.

Nolsø, Faroe—Flugga, Shetland. R/V *Dana*. 17-19 August 1950. Figure 58.

At exactly the same depth on the same station vertical two weeks later, the Danish research vessel *Dana* recorded the minimum temperature of —0·93°C in conjunction with the salinity of 34·95‰, but once again the *Dana* section revealed no Arctic water in the deeps of the Channel, the minimum salinity recorded being 34·90‰. Compared with the previous section also, two weeks before, the zero isotherm of the *Dana* section lay appreciably deeper—between 575 and 750 metres as compared with 550 to 675 metres—and, disregarding only the extraordinary salinity of 35·57‰ on the earlier section, two maximum nuclear salinities on the *Dana* section across the Atlantic Current on 19 August, at 35·43‰ and 35·41‰ respectively, were distinctly higher than that (35·38‰) of two weeks before. Moreover, the 35·30‰ isohalines, interrupted on the *Dana* section to form in effect a double core of the Atlantic Current, evidently embraced a greater body of water on the section then than in the beginning of the month. Hence, in line with the indication previously given during the month of June regarding the apparent association of incursion and retraction of the Arctic water-mass into the deep Channel layers, with diminution and accession respectively in the strength of the Atlantic Current, it appears that the Current may actually have waxed somewhat in intensity during the month of August. This indication, it will be observed, is illustrated by the appropriate curve on Figure 7.

While, as above implied, the double core of the Atlantic Current between Faroe and Shetland in the third week of August 1950 may be regarded as having been bounded by the 35·30‰ isohalines, each part of the core obviously, by Figure 58, had an inner core within 35·35‰ isohalines. From the outer cores, only one of which broke surface, the diminution in salinity towards the surface and north-westwards, to below 35·20‰ for one-third of the length of the section from Faroe, implied, as frequently occurs on this section, freshening influence from the southern reaches of the Norwegian Sea to the north.

The *Dana* section revealed no trace of Gulf of Gibraltar water.

The maximum temperature of the section was 13·50°C on the surface only a few miles from Shetland, and rapid declination of temperature to under 9°C was evident in the uppermost 100-metre layer over the greater part of the section.

Faroe Bank—Butt of Lewis. 3-5 November 1950. Figure 59.

Although, as has already been shown dynamically, the oceanic water-mass in the Faroe-Shetland Channel in early November 1950 flowed apparently with considerably greater intensity than in the month of August, it is clear from Figure 59 that the bulk of this oceanic water in November was of a salinity under 35·30‰, the isohaline of which defined the core of the mass in August and included salinity nuclei in excess of 35·40‰. In November, there appeared only a single small nuclear salinity greater than 35·30‰ at 200 metres depth over against Faroe Bank, where 35·36‰ was registered. On the other hand, by contrast, three small patches of under 35·25‰ salinity water appeared within the main oceanic water-mass in the uppermost 250-metre layer, indicating apparently the beginnings of an influence which was much more marked only a few days later on the more northerly section between Faroe and Shetland.

The temperature of the main bulk of the oceanic water on the southern section lay between about 9°C and just over 10°C, but the maximum temperature of the section was recorded as 11·14°C in almost the entire water column of salinity 35·08‰ to 35·18‰ on the station nearest to Shetland.

Rather more also than is sometimes apparent on the southern section between Faroe Bank and the Butt of Lewis, the deeper water salinities below 500 metres between the Bank and the Wyville Thomson Ridge gave clear indication of the return to the Channel of the intermediate Arctic water-mass which apparently withdrew from it at mid-August after being present there two weeks previously, the minimum temperature of this water in November being —0·71°C.

Conditions on the southern slope of the Wyville Thomson Ridge in November 1950 were also somewhat unusual, although apparently of a kind which in various stages have been met before in these investigations. A small body of warmer and salter water than in the immediate vicinity seems, when this section was taken, to have become isolated, at least temporarily, on the upper part of the slope. Lower down, fresher water than is customarily found at these depths in this location and which may have cascaded down from the top of the Ridge, was similarly more or less sealed off from the surrounding higher salinity water-mass.

Nolsø, Faroe—Flugga, Shetland. 6-7 November 1950. Figure 60.

Although this section was not completed to the extent of three stations at its south-eastern (Shetland) end, it is clear from Figure 60 that, around maximum salinity of 35·27‰-35·28‰, at least a significant part of the core of the Atlantic Current, in an unusual position in the middle of the section for a major division of the core, was contained within the isohaline of 35·25‰, which also, over two adjacent stations, and to a depth of 30 metres, included the maximum recorded temperature of the incomplete section, namely, 9·76°C. The core, as illustrated, also plumbed the not inconsiderable depth in a mid-section location of at least 300 metres.

The convergence of substantial masses, apparently, of fresher and colder waters with either flank of the Atlantic Current is manifest on the section diagram of temperature and salinity distributions. Since, however, as already mentioned, this northern section of November 1950 had perforce by adverse weather to be abandoned before crossing the region which normally embraces the Atlantic Current high salinity core, it is appropriate to cite here two later stations on latitude 61°01′N at longitudes 1°30′W and 1°00′W respectively on 12 November, forming part of a subsequent cruise by another research vessel, at which not only the major salinity observations of the incomplete earlier section were reproduced from surface to bottom, but some superior values were also recorded. It seems not improbable from these observations, including also higher temperatures, that the fresher water restrictive influences which by Figure 60 were obviously encountered on the Faroe-Shetland section by the Atlantic Current on its north-easterly course, divided the core of the Current into two parts, only one of which, in mid-section, was revealed by the observations taken. From the occurrence at longitude 1°30′W on 12 November, from 40 metres to the bottom, of salinities (35·30‰-35·32‰) superior to any found on the uncompleted section of 6-7 November, and temperatures of over 10°C to 10·21°C, it can be inferred that the more significant portion of the divided Atlantic Current flowed, as usual, along the continental edge west of Shetland.

The restrictive influences above-mentioned came almost certainly from the north into the north-western part of the section at least—ultimately no doubt from the East Icelandic Arctic Current—but on the south-eastern half of the section on the other hand, except in so far as some of the fresher intrusion there may represent, in return by eddy circulation, a continuation of the northern incursion, may have derived from more southerly latitudes bordering on the north-western North Sea, as is suggested by the current system of the region (Tait, 1937, p. 53).

The intrusion of intermediate layer Arctic water into the deeper layers of the Channel below 500 metres, and indeed at the southern end of the section to within 300 metres of the surface, is conclusive on Figure 60, the process, either of the undermining of bottom Norwegian Sea water which normally occupies these deeper levels by the Arctic influx, or the cleavage of the latter by renewed intrusion of the former in strength, being evident in the peculiar shape of the 34·90‰ isohaline. The minimum temperatures of these two deep water-masses differed but little from —0·66°C in respect of the bottom Norwegian Sea water-mass to —0·75°C in the Arctic mass, the latter on this occasion apparently being the colder which seems not always to be the case.

These, then, were the final observations in the Channel in the year 1950 and, in summary, the year differed from former years in the following respects.

Although, as in 1949, the core of the Atlantic Current almost throughout the year was bounded by the 35·30‰ isohaline, the maximum nuclear salinities of 1950 were distinctly higher than those of the previous year. There was also a tendency until the early autumn for maximum temperatures to be somewhat higher in 1950 than in 1949. In the two November months, however, the situation was reversed, and in November 1950 only the 35·25‰ isohaline defined the central core of the Atlantic Current.

In August 1950 a similar isolated trace of Gulf of Gibraltar water was found on the northern section as appeared on the southern section of May 1948, and possibly also on the same section in June 1947. Compared with the early 1930's, however, these indications have been only of the most sporadic occurrence since.

The appearance, with apparent short-period recessions, of the two types of Arctic water first differentiated in the year 1949, marked also the majority of the eleven sections of 1950. The originally surface Arctic mass, however, as distinguished from that deriving from an intermediate layer of the south-western Norwegian Sea, occurred in lower minimum salinity (34·77‰) on the northern section of the month of May, than has previously been recorded from the Channel region since Robertson's (1909b) record of August 1908. It may be that, as in the former case, this record of 1950 signified a maximum in the intensity of this influence in the Channel over a period of at least three years.

1951

In 1951, commencing in the third week of May, until towards the middle of December, three pairs of the standard hydrographic cross-sections of the Channel in May-June (Figures 61, 62), June (Figures 63, 64), and July (Figures 65, 66), respectively, with two Wyville Thomson Ridge sections in August (Figure 67) and September (Figure 68), and two Faroe to Shetland sections in October (Figure 69) and December (Figure 70), are available for examination.

Latitude 62°02′N, longitude 9°18′W—Faroe Bank—Butt of Lewis. 18-20 May 1951. Figure 61.

In the third week of May 1951, on the southern section over the Wyville Thomson Ridge, a single maximum nuclear salinity of 35·41‰ at 50 metres depth was recorded within the core of the Atlantic Current between 35·35‰ isohalines, embracing a body of water no less than 700 metres deep from the surface off the continental slope. Two smaller, and probably detached, portions of this massive core appeared at the same time around nuclear salinities of 35·37‰ in the upper 250-metre layer between the Wyville Thomson Ridge and Faroe Bank. North-west of Faroe Bank, a fourth maximum nuclear salinity, this time of 35·42‰ at a depth of 300 metres, was the focal point of still another part of the Atlantic Current core. The fact that this was the highest nuclear salinity of the section, in conjunction with its being the centre apparently of at once a more compact and more clearly defined core of the Atlantic Current than any of the other three high salinity parts of the Current on the south-eastern side of Faroe Bank, suggests that in fact the main part of the Atlantic Current at this period of May 1951 was that which flowed to the west of Faroe Bank and not over the Wyville Thomson Ridge into the Faroe-Shetland Channel. As previously noticed (p. 45), the dynamics of the two parts of the section on either side of Faroe Bank bear out this deduction. The maximum temperature of the section, namely, 9·56°C, was associated with much diluted oceanic water off the Butt of Lewis, the maximum temperature of the 'stronger' oceanic water being somewhat less. It compares with a maximum of 11·20°C on the same section one year earlier.

The normal bottom Norwegian Sea water with a minimum temperature of —0·75°C, appeared between the Wyville Thomson Ridge and Faroe Bank in depths substantially below that of the summit of the Ridge.

Nolsø, Faroe—Flugga, Shetland. 1-2 June 1951. Figure 62.

Overtaken almost exactly two weeks after the above section across the Wyville Thomson Ridge, the section between Faroe and Shetland on 1-2 June 1951 showed a lower maximum temperature (9·23°C) than farther south two weeks before, and a main bulk of oceanic water of appreciably lower salinity than on the earlier southern section, the cross-sectional contraction of the 35·35‰+ salinity core of the Atlantic Current being most marked. A secondary nucleus of the Current occurred between 100 and 150 metres on the north-western part of the section near Sandø Bank.

The above contraction may have been associated with the following circumstance.

There is, of course, less likelihood on the southern section, because of the very much smaller area it would occupy, of sounding Arctic water as distinct from bottom Norwegian Sea water, than on the section between Faroe and Shetland. Nevertheless, the apparent extent of the intrusion of intermediate Arctic water, with a nucleus also of surface Arctic water (salinity 34·83‰) at 600 metres depth, into the deeper layers of the northern section in the beginning of June 1951, was, by Figure 62, so great, that an indication at least of its presence between the Wyville Thomson Ridge and Faroe Bank two weeks before might have been expected. According to Figure 61, however, it was entirely absent from this region at the material time. Its intrusion between Faroe and Shetland is a factor which normally may tend to obstruct the intensity of the oceanic incursion through the Channel, but as the figures of Table 1 show, this was evidently not the case in the beginning of June 1951, the high transport figure then obtained being, as previously noted, supported by that pertaining to the same section worked by the Danish research vessel one week later. Before considering this section, however, notice may be taken of the unusual position along the bottom of the section under review of a body of bottom Norwegian Sea water *below* the intermediate Arctic water-mass. It has so far been usual to find bottom Norwegian Sea water more or less entirely sandwiched between the Arctic and oceanic water-masses. On this occasion there was no difference between the minimum temperatures (−0·84°C) of the bottom Norwegian Sea and Arctic water-masses on the section.

Nolsø, Faroe—Flugga, Shetland. R/V *Dana.* 7-9 June 1951. Figure 63.

Conditions on this section show some striking differences in temperature and salinity distributions from those of the same section one week before. Maximum temperature has now risen to 9·78°C within an oceanic core of salinity greater than 35·40‰ to 35·44‰, situated, as normally, off the continental edge, a secondary core contained by the same isohaline occurring in the uppermost 50 metres in mid-section.

The bottom waters, however, protruding upwards at both ends of the section into the oceanic layer, were not only entirely devoid of any trace of Arctic water, but in the main apparently consisted of sub-oceanic water with salinity between 34·96‰ and 34·99‰, and a minimum temperature of −0·90°C. Bottom Norwegian Sea water in fact (salinity less than 34·95‰) appeared only as isolated bodies of water between 500 and 850 metres against the continental slope, and between about 400 and 600 metres on the Faroe shelf slope.

Faroe Bank—Butt of Lewis. 16-17 June 1951. Figure 64.

Again with an interval of one week between it and the preceding section between Faroe and Shetland, that between the Faroe Bank and the Butt of Lewis was completed on 16-17 June 1951.

Figure 64 shows three maximum salinity nuclei, two of 35·43‰ and one of 35·44‰. Two of these nuclei were within the obvious core of the Atlantic Current defined by the 35·35‰ isohaline in mid-section extending vertically to 400 metres beneath the surface. The maximum temperature of the section at 11·55°C was recorded on the surface some distance south-eastward of this core in the outer waters of a strong fresher-water convergence, probably from west Scottish coast waters, which is indicated on the section diagram north-westward from the Butt of Lewis.

Bottom waters between the Wyville Thomson Ridge and Faroe Bank, by their salinity of 34·88‰-34·89‰, were obviously of the intermediate Arctic water layer from the south-western Norwegian Sea. Their minimum temperature was −0·66°C.

Faroe Bank—Butt of Lewis. 13-15 July 1951. Figure 65 (see footnote, p. 45).

Recession in the strength of the Atlantic Current in the Faroe-Shetland Channel between mid-June and mid-July 1951, as shown by the dynamic figures of Table 1, was reflected in the overall diminution, by approximately 0·05‰, in the salinity of the oceanic water about the Wyville Thomson Ridge region at the latter period as compared with mid-June conditions on the same section. In July, maximum salinity nuclei of just over 35·35‰ replaced, as it were, those of more than 35·40‰ in the earlier section, and, in the intervening month, the core of the Atlantic Current, now defined by the 35·30‰ isohaline instead of that of 35·35‰ as in June, appears in the main—a remnant of the core remaining against the uppermost slope of Faroe Bank—to have diverted towards the east, from about mid-section in June to over against the continental slope in July, plumbing some 200 metres deeper in the latter month. This greater depth of the base of the core of the Atlantic Current, to below the mean level of the Wyville Thomson Ridge, suggests lateral pressure on the northern flank of the Current, and it is evident from Figure 65 whence such lateral pressure probably derived. Despite the lack of deep-level observations between Faroe Bank and the Wyville Thomson Ridge to confirm it, the clear indication of those isotherms and isohalines which do appear in this region in Figure 65 is of intrusion, either from the north or from below, of colder and fresher water into the body of the oceanic water-mass. The intruding water-mass was probably Norwegian Sea bottom water, or Arctic water, or perhaps a mixture of both.

The temperature of the main bulk of the oceanic water-mass remained fairly steady at between 8°C and 10°C during the month between mid-June and mid-July, but the uppermost water layer of about 50 metres, more or less, registered further increase in temperature to a maximum of 12·4°C in mid-July.

The same indication of strong fresher-water influence on the Butt of Lewis end of the section in mid-July as in the previous month is given on Figure 65.

Nolsø, Faroe—Flugga, Shetland. 23-25 July 1951. Figure 66.

With no distinctive high salinity nucleus on this section, the core of the Atlantic Current, as on the more southerly section ten days earlier, was again, between Shetland and Faroe, contained within 35·30‰ isohalines in two substantial parts, one in about mid-section and the other over and extending far out from the continental shelf. Neither core broke surface on the section, but lay between depths of about 25 metres and 300 to 375 metres. Fresher water influence, with maximum surface temperature again about 12½°C, separated these two parts of the central oceanic water-mass. Upthrust or horizontal intrusion of the freshening influence which in subsurface layers was also colder than the central Atlantic Current water, is evidenced by the trend of isotherms and isohalines in Figure 66.

The bottom waters of the section showed the new dispositional peculiarity of bottom Norwegian Sea water, with a minimum temperature of —0·93°C, sandwiched *vertically* between two masses of intermediate Arctic water each of 34·88‰ salinity and minimum temperatures of —0·86°C and —0·87°C respectively.

Faroe Bank—Butt of Lewis. 15-16 August 1951. Figure 67.

Flowing apparently with similar intensity as it did one month earlier, although evidently with greatly reduced velocity, it is the more surprising therefore that the main bulk of the oceanic water-mass on this section in mid-August 1951 should have been superior in salinity, namely 35·35‰-35·40‰, that is, 0·05‰ higher, than the corresponding character in mid-July. Maximum temperature also registered a small increase to 12·79°C. One especially of three isolated high salinity nuclei, however—recalling the significance of similarly high salinity records in the early 1930's—may give at least a pointer to the possible source of the general elevation of salinity throughout the oceanic water-mass between July and August 1951, without the accompaniment of greater intensity in the flow of the Atlantic Current. On the same station on the continental slope off the Butt of Lewis, isolated salinity values of 35·68‰ at 20 metres, 35·48‰ at 75 metres, and 35·48‰ at 150 metres, occurred in a vertical water column of salinity 35·37‰ to 35·39‰. These isolated records, in association with their accompanying temperatures, do not, it is true, yield density values which are specifically those of Gulf of Gibraltar water, but, none the less, they would appear to signify intrusion of this type of water into the oceanic water-mass. The occurrence in the neighbourhood, indeed at the same station and the same time, of certain planktonic species of "Biscayan or Lusitanian origin" as described and noted by Fraser (1952), would appear to enhance the probability of this being the source of the higher average salinity of the oceanic water-mass over the Wyville Thomson Ridge region in August 1951.

Observational evidence from the north side of the Wyville Thomson Ridge on this occasion was that the deepest waters comprised only bottom Norwegian Sea water, with no sign of Arctic water present.

Faroe Bank—Butt of Lewis. 19-20 September 1951. Figure 68.

Although of lesser magnitude (35·50‰), one of several more or less isolated high salinity nuclei distributed through the upper water layers of this section, as in the previous month, suggests a remnant of Gulf of Gibraltar water intrusion into the oceanic water-mass of the Faroe-Shetland Channel in the autumn of 1951. Again, at exactly the same station as the maximum salinity record occurred, at 100 metres depth, Fraser (1952) notes the capture of planktonic organism which are specifically indicative of, in his terminology, Lusitanian water, which may be taken as synonymous with that designated Gulf of Gibraltar water in the foregoing. Figure 68 illustrates the distribution in September 1951 of the other, lesser, high salinity nuclei referred to above, one of which immediately over the Wyville Thomson Ridge apparently extended in considerable depth from just under 100 metres to 400 metres.

Maximum temperature of 12·70°C was registered at 30 metres depth on the station nearest to the Butt of Lewis, within the fresher west Scottish coast waters flanking the oceanic water-mass.

Again, apparently, no Arctic water displaced bottom Norwegian Sea water on the north side of the

Wyville Thomson Ridge, and it is noteworthy how deeply the 35·00‰ isohaline apparently lay between Faroe Bank and the Wyville Thomson Ridge in both August and September 1951.

Nolsø, Faroe—Flugga, Shetland. 28-30 October 1951. Figure 69.

Figure 69 reveals none of the high maximum salinities which may be taken to have been indicative of the presence of Gulf of Gibraltar water in the body of the oceanic water-mass over the Wyville Thomson Ridge region in both August and September 1951. Several nuclei, the highest of them scarcely above 35·40‰ salinity, appear in the uppermost 200 metres of water on the October section, but these are characteristic in magnitude of Atlantic Oceanic water proper in this region. The highest salinity value recorded, namely, 35·43‰, was a surface record off the continental edge, within the core of the Atlantic Current as defined by the 35·35‰ isohalines, but at the same time, considerable freshening influence was noted in mid-section from the surface down to about 100 metres.

By the end of October, maximum temperature had fallen to 10·90°C, recorded at 30 metres depth on the south-eastern end of the section, by coincidence, therefore, at the corresponding position and depth as the maximum temperature of the September section between the Butt of Lewis and Faroe Bank.

As can be seen from Figure 69, the bottom waters were well sounded observationally in October 1951, and although a very substantial cross-sectional area of these registered sub-zero temperature to a minimum of —0·85°C, they were remarkably uniform in salinity at 34·92‰-34·95‰, signifying only bottom Norwegian Sea water without any sign of intrusion of Arctic water as occurred on the same section three months before.

Nolsø, Faroe—Flugga, Shetland. R/V *Dana*. 10, 12-13 December 1951. Figure 70.

Without any high salinity nucleus, the core of the Atlantic Current, towards the middle of December 1951, between Faroe and Shetland, was well defined by the 35·40‰ isohalines within which salinity was very uniform at approximately 35·42‰-35·44‰. Maximum temperature on the section, of 9·80°C, occurred to a depth of 50 metres from the surface immediately eastward of the main Atlantic water core. A slight indication of intermediate Arctic water intrusion into the deeper layers below about 650 metres against the slope of the Faroe shelf was given by observations at 800 metres and 1020 metres at a single station, the remainder of the deep water in cross-section comprising only bottom Norwegian Sea water of salinity 34·92‰ to 34·95‰. The minimum temperature of —0·84°C was registered within this water at 1100 metres depth.

Thus, between the months of May and December 1951, the core of the Atlantic Current in the Faroe-Shetland Channel was characterised by a distinctly higher average salinity than in either of the previous two years at least and, on the whole, by the highest maximum nuclear salinities recorded since the resumption of observations in the region after the war. Traces of Gulf of Gibraltar water within the oceanic water-mass were evidently present again in August (as in 1950), and in September, but the phenomenon of heavy oceanic water in the bottom of the Channel was not observed throughout 1951.

Only one section, the earlier northern section of June 1951, contained any evidence of the presence of surface Arctic water in the deeper layers of the Channel, and that only in nuclear isolation. Intermediate Arctic water (although present in considerable bulk on the northern section in the beginning of June, in lesser quantity in July and only in small amount in December, and on the southern section also in June) was obviously considerably less intensive and persistent in its influence than in 1950, thus indicating in the latter year a maximum intensity of this influence which had been building up since the first traces of it were observed in the summer of 1946.

1952

Investigations in the Faroe-Shetland Channel in 1952 began with a traverse of the section between Shetland and Faroe between 18 and 20 February (Figure 71). The section between the Butt of Lewis and Faroe Bank and its extension north-westward to longitude 9°30′W was accomplished in the following month (Figure 72), and both the standard sections were completed in May (Figures 73, 74) and in July

(Figures 77, 79) and again in November (Figures 80, 81), while crossings of the northern section were additionally overtaken at the end of May by *Dana* (Figure 75) and in June by *Scotia* (Figure 76). The short section due north of Faroe to latitude 64°N was accomplished in the month of July (Figure 78).

Nolsø, Faroe—Flugga, Shetland. 18-20 February 1952. Figure 71.

Figure 71 at once reveals abnormal peculiarities in the temperature-salinity distributions in the northern part of the Faroe-Shetland Channel in February 1952. Most unusually, the most saline (35·41‰) oceanic water was found near to the western shores of Shetland, although maximum temperature, on the other hand, around 8·3°C, occurred approximately along the 35·35‰ isohaline some 30-35 miles north-westward of Shetland.

Explanation of what would appear to be a powerful downward thrust of oceanic water into the underlying bottom Norwegian Sea water below about 400 metres, as indicated by both isotherms and isohalines, may be derived, at least in part, from further evidence in Figure 71. Intermediate Arctic water evidently tended to intrude into and partially to displace bottom Norwegian Sea water from the deeper layers against the slope of the Faroe shelf. It is to be borne in mind that the intensity of the oceanic incursion into the Channel in February 1952 was apparently very great. It would therefore the less easily tend in its turn to be displaced by upthrust of the bottom Norwegian Sea water, making room, as it were, for Arctic water alongside and somewhat below it, the result being that the Norwegian Sea water was sandwiched between the other two masses. The deeper water mid-section temperature-salinity distributions illustrated in Figure 71 are suggestive of conditions which may be antecedent to the formation of sub-oceanic water such as appeared in isolation on the diagram for the same section in October 1951 (Figure 69).

The minimum temperature of the bottom Norwegian Sea water-mass in February 1952 was recorded as —0·89°C in 900 metres, and that of the intermediate Arctic mass, —0·86°C in 1000 metres.

Latitude 62°15′N, longitude 9°30′W—Faroe Bank—Butt of Lewis. 10-14 March 1952. Figure 72.

It may be observed, first of all, that maximum salinity on this section towards the middle of March 1952 only just attained to 35·35‰, and was therefore at least 0·05‰ less than the maximum on the more northerly section three weeks earlier. This would seem to imply that in the interval, and as regards its intensity of flow, the Atlantic Current was in regression rather than the reverse as is implied by the dynamic figures of volume transport in Table 1. In discussing these figures, however, circumstances were cited which occasioned doubt of their accuracy as true measures of the conditions at the times involved, and the above hydrographical circumstances rather favour the suggestions previously made to the effect that the February figure of practically 12 Km³/hr. was probably too low and the March one of 14½Km³/hr. too high, the true trend of events being more probably in accordance with the respective maximum surface velocities of 15 and 9 miles per day approximately.

The core of the Atlantic Current in March 1952 on the Wyville Thomson Ridge section, besides being sub-divided into two distinct parts by slightly fresher water intrusion a little to the northward of the Ridge, occupied in its more substantial part a more usual position on the section off the continental slope than on the more northerly section of February, when it was located apparently close against the north-western coasts of Shetland; and although of appreciably lower salinity than three weeks previously, this Atlantic Current core in March bore a temperature approximately 1°C higher, probably to be accredited to seasonal influence, than in the previous month, maximum temperature on the March section being 9·13°C.

A further, smaller core of Atlantic water on the March section, of lower salinity by about 0·05‰ than within the Channel region proper, was located towards the northern extremity of the extension of the section beyond Faroe Bank, this core having a temperature of under 8°C, and therefore no doubt already affected to some extent by colder water influences of northerly origin.

On the February section between Faroe and Shetland, intermediate Arctic water of salinity 34·89‰ was noticed in the deeper water layers below 450 metres, especially on the eastern slope of the Faroe submarine shelf. In March, on either side of the Faroe Bank, this evidence of the presence of Arctic water in the deepest layers was more distinctive in that minimum salinities as low as 34·86‰ were observed, although the minimum temperature in this case, —0·58°C on the south-eastern side of the Bank was not so low as that (—0·89°C) registered in the same depth of 900 metres in February in the Channel between Faroe and Shetland.

Faroe Bank—Butt of Lewis. 8-11 May 1952. Figure 73.

When, by Table 1 (see also Figure 7), the dynamic intensity of the Atlantic Current was apparently at or near a minimum in the second week of May 1952, Figure 73 suggests a somewhat confused salinity distribution in the region between Faroe Bank and the Butt of Lewis, especially over the Wyville Thomson Ridge. The core of the Atlantic Current, again slightly in excess of 35·40‰ salinity (to maximum nuclear salinity of 35·43‰ and thus approximately 0·05‰ higher than the corresponding March quantity) was again in two parts, only slightly separated by fresher water intrusion, but the main part was now situated over and northward of the Wyville Thomson Ridge, instead of between the Ridge and the British continental slope as in March.

Southward of the Atlantic Current core there were several instances, as can be seen from Figure 73, of a disintegrated fresher-water intrusion into the oceanic water-mass, in the nuclei registered of under 35·35‰ salinity water and in one case of under 35·25‰ salinity. A nucleus of 35·41‰ salinity at 100 metres depth off the continental edge may be taken to signify this slight survival of nuclear Atlantic water in the somewhat turbulent conditions instigated by conflict of different water-masses, one fresher than the other, and further instanced presumably in the peculiar and involved trend of the 35·35‰ isohaline.

Maximum temperature, as might be expected, had by about mid-May risen to 10·25°C on the surface of the section, but considerably south-eastward of the Atlantic core.

In view of the slow transport of oceanic water at the time, or perhaps because of it if the dynamics of the situation were fully understood, the apparent isolation of a small pocket of relatively salt oceanic water on the southern slope of the Faroe Bank between about 400 and 700 metres, is a feature of Figure 73. It may also be noted that there is no evidence on this occasion of the presence of deep water of Arctic origin between the Wyville Thomson Ridge and the Faroe Bank slope as was present there two months previously. Only Norwegian Sea water was located in this deep trough or toe of the Faroe-Shetland Channel in May 1952.

Nolsø, Faroe—Flugga, Shetland. 18-19 May 1952. Figure 74.

Again, as in the month of February 1952 on this same section, the core of the Atlantic Current within the 35·35‰ isohaline, but containing a nucleus of 35·41‰ salinity, lay practically over against Shetland on the continental shelf. Similar evidence as to the turbulent nature of the uppermost 250 metres of water is contained in Figure 74 as in the previous diagram for the more southerly section. Again there was a number of minimum salinity nuclei and again one maximum nucleus within the main oceanic water-mass above about 250 metres; the tortuous course of the 35·20‰ isohaline on the northern section compares strikingly with that of the 35·35‰ isohaline on the southern one. In cross-section, the bulk of the oceanic water-mass between Shetland and Faroe was of substantially inferior salinity to that of the same water-mass in the Wyville Thomson Ridge region, further indicative of dilution by fresher water influence which the minimum salinity nuclei suggest. Maximum temperature also on the northern section at 9·43°C was thus 0·82°C lower than the maximum temperature of the southern section about one week earlier.

In contrast to the circumstances noted in respect of the deep water to the north of the Wyville Thomson Ridge to Faroe Bank, Figure 74 reveals the intrusion into the deep Channel between Faroe and Shetland of a considerable amount of at least intermediate Arctic water as signified by salinity records below 34·90‰ to a minimum of 34·84‰, such water occupying almost half the cross-section of the Channel below about 550 metres. However, as appears not infrequently to be the case, the minimum temperature of this Arctic water-mass (—0·76°C) was not so low as that (—0·98°C) of the bottom Norwegian Sea water alongside it.

Nolsø, Faroe—Flugga, Shetland. R/V *Dana*. 31 May-2 June 1952. Figure 75.

The last-mentioned feature above, of the juxtaposition in almost equal proportions of intermediate Arctic and bottom Norwegian Sea water in the deep layers of the Faroe-Shetland Channel between Shetland and Faroe, is strikingly reproduced in Figure 75, which illustrates the temperature and salinity distributions on the same section repeated by the *Dana* two weeks after the *Scotia* traverse, and again it is demonstrated that the minimum temperature of the Norwegian Sea water-mass was lower than that of the Arctic water-mass of inferior salinity. The core of the Atlantic Current, although in cross-section apparently bulking larger than on the earlier section, was again defined by the 35·35‰ isohalines with only the single indication in this instance of a nuclear salinity of 35·40‰. Maximum temperature had only slightly risen to 9·67°C in the two weeks since the previous survey.

If, as seems probable, the isolated salinity nuclei of the previous two sections do in fact indicate considerable turbulent activity in the upper water layers above about 250 metres, there is much less evidence of such activity on the *Dana* section, which may in turn indicate stronger progressive movement of the oceanic water-mass as a whole and thus bear out the implication to this effect of the dynamic figures of Table 1, and of the appropriate curve of Figure 7.

Nolsø, Faroe—Flugga, Shetland. 21-22 June 1952. Figure 76.

For the third time, in this instance after an interval of three weeks, there is illustrated in Figure 76 a remarkable division of the deep waters below about 500 metres between Faroe and Shetland. But on this occasion it will be observed that it is an isohaline of lower order, namely, 34·85‰ which, in cross section, almost centrally and vertically, apparently divides the deep water-mass into two parts. That against the slope of the Faroe Shelf, except perhaps for a narrow vertical strip along the lower reaches of the slope from about 750 metres downwards to over 1300 metres, is of surface Arctic characteristics with salinity 34·84‰-34·81‰ and minimum temperature —0·88°C, while, on the side of the continental slope, the main bulk of the deep water was of appreciably higher salinity and minimum temperature, namely, 34·89‰-34·86‰ and —0·54°C respectively, indicating intermediate Arctic water. It will be seen also from Figure 76 that a small amount of bottom Norwegian Sea water had apparently become isolated between about 900 metres and 1150 metres against the continental slope and within the intermediate Arctic water-mass, this Norwegian Sea water showing its usual characters of salinity superior to 34·90‰ and a lower minimum temperature (—0·96°C) than the Arctic waters alongside it.

The remainder of the picture of temperature-salinity conditions between Shetland and Faroe in the latter part of June 1952 is one of apparent conflict between the advancing oceanic water-mass and freshening influences presumably from the north. Maximum temperature in the upper water layers showed very little advance on that on the same section three weeks earlier, being still below 10°C (9·91°C) towards the end of June. Maximum nuclear salinity within the oceanic water-mass, at 35·36‰, was distinctly lower than the corresponding 35·40‰ at the beginning of the month, and the cross-sectional area of water of salinity greater than 35·35‰ was also markedly less. These circumstances are, or would appear to be, reflected in the difference between the oceanic volume transports through the two sections as recorded in Table 1. It is also apparent from Figure 76 in the two minimum salinity nuclei within the 35·30‰ to 35·35‰ salinity water-mass, which roughly corresponds to the 35·35‰ to 35·40‰ water at the beginning of the month, that freshening and colder influx affected the Atlantic incursion during the month. This inference is indirectly substantiated by the much greater evidence of more pronounced Arctic water intrusions into the deep waters of the Channel towards the end of the month, these Arctic waters then all but completely underlying the normal bottom Norwegian Sea water of the depths of the Channel.

Latitude 62°15′N, longitude 9°30′W—Faroe Bank—Butt of Lewis. 5-7 July 1952. Figure 77.

Forming the nucleus of one of the two cores of 35·40‰+ salinity water into which the Atlantic Current was evidently divided north-west of the Butt of Lewis in the first week of July 1952, a maximum salinity nucleus of 35·48‰ was registered on the continental edge. It is a question whether, since apart from this singular value the maximum salinity of both parts of the core was 35·44‰, this isolated nucleus may represent a remnant of Gulf of Gibraltar water.

Maximum temperature of 12·94°C was observed superficially immediately beyond the south-eastern boundary of that part of the Atlantic core which included surface water. The other part, as can be seen from Figure 77, lay between about 50 metres and 300 metres almost over the Wyville Thomson Ridge.

North-west of Faroe Bank, on the extension of the section in that direction, the core of the Atlantic water-mass lay between 35·30‰ isohalines.

In the deeper levels between the Wyville Thomson Ridge and Faroe Bank a single observation of 34·88‰ salinity at 800 metres indicated the presence of intermediate Arctic water in the toe of the Channel in July 1952, beneath bottom Norwegian Sea water, but none of this Arctic water type appears to have reached the north-west side of Faroe Bank as on former occasions, presumably through the channel between the Bank and the Faroe Islands shelf to which attention was drawn by Robinson (1952).

Viderø, Faroe—Northward on longitude 6°35′W, to latitude 64°N. 11-12 July 1952. Figure 78.

A substantial cross-section of the above intermediate Arctic water-mass of salinity 34·88‰-34·89‰ was found on this section due north of Faroe less than one week after the traverse from the Butt of Lewis over Faroe Bank, denoting the almost certain derivation of this water type which was observed in the toe of the Faroe-Shetland Channel. For the rest, Figure 78 shows the marked restriction of the Atlantic water-mass north of Faroe, where in the short distance travelled, its temperature also, in the upper layers especially, shows appreciable decline from 10°-10½°C north-west of Faroe to approximately 9½°C-9¾°C.

Nolsø, Faroe—Flugga, Shetland. 17-18 July 1952. Figure 79.

A nucleus of 35·41‰ maximum salinity distinguishes the core of the Atlantic Current on this mid-July Faroe to Shetland section from the same section almost one month before, and to this extent at least indirectly supports the somewhat higher oceanic transport result for the later section. The cross-sectional area, however, of the core of the Atlantic Current within the 35·35‰ isohaline was also considerably greater in July than in the previous month. Maximum temperature also, at 11·68°C, as well as the mean temperature of the Atlantic water-mass as a whole on the section in July, showed substantial increase over the corresponding quantities in June.

Also evident by comparison of Figures 79 and 76 is the marked retraction of Arctic water from the deep layers of the Channel in the month between the two sections, giving place to the intrusion of bottom Norwegian Sea water in much greater quantity, but with a higher minimum temperature (−0·89°C as against −0·96°C) as the summer progressed.

Faroe Bank—Butt of Lewis. 4, 8-9 November 1952. Figure 80.

When this section was previously traversed in the first week of July 1952, it was noted that one of the two parts into which the core of the Atlantic Current had apparently been divided, embraced a high nuclear salinity of 35·48‰ on the continental edge, suggestive perhaps of the entrapment within the oceanic water-mass of a small relic of water of extra-Mediterranean rather than of oceanic origin. Towards the other, that is, the Faroe Bank, end of the same section in early November, occurred, apparently at 170 metres depth off the edge of Faroe Bank, the extraordinarily high salinity of 35·59‰, which is almost certainly indicative of Gulf of Gibraltar water, especially when considered in conjunction with two further abnormal conditions encountered on the November section.

One of these unusual conditions was the location in cross-section of a small but definite body of high salinity water (>35·40‰) on top of the Wyville Thomson Ridge and within the main body of the oceanic water-mass as defined by the 35·35‰ isohalines. The trends of these, particularly of the deepest one, carry the usual implication on this section of an upsurge of deep water as a result of its impingement against the southern slope of the Wyville Thomson Ridge. Still another portion of similarly high salinity water was found isolated against the continental slope between about 300 and 500 metres.

Another feature of this November section, as illustraged in Figure 80, which would appear by inference and deduction to contribute to the actuality of the 35·59‰ salinity record and to its significance as representing the nucleus of an intrusion of Mediterranean-derived water, are the dispositions in the deeper levels between the Wyville Thomson Ridge and Faroe Bank, of the 35·30‰ and inferior isohalines, and of the isotherms below that of 7°C, and also the abnormally great depths to which especially the lowermost of these isotherms and isohalines attained. There would appear on this occasion to have been very little if any bottom Norwegian Sea water, as is normally to be found, in this deep toe of the Faroe-Shetland Channel between the Wyville Thomson Ridge and Faroe Bank. The significance of this and of the trends of the lower isotherms and isohalines in these depths would seem to be that the phenomenon they represent, namely, the deep penetration here of the oceanic water-mass, far below the saddle depth of the Wyville Thomson Ridge, was caused by the intrusion of a mass of Gulf of Gibraltar water at a higher level in the water column (between about 150 and 250 metres from the sea surface), to some extent displacing the oceanic water-mass from over the Wyville Thomson Ridge. From its position on the section it seems not improbable that this higher level influx of Gulf of Gibraltar water may have entered the Channel by way of the west and north of Faroe Bank, having possibly somewhere south of the Channel region become detached from a larger body of the same water-mass.

It should further be noted that this is the first occasion on which the presence of this typically extra-Mediterranean influence has been observed in the Faroe-Shetland Channel so late in the year, thus affording just another indication of those unexpected anomalies which systematic investigation over a long period not infrequently reveals in a region of confluence of different water-masses.

The maximum temperature of this southern section of November 1952 was 10·70°C within the south-western boundary of the oceanic core.

Nolsø, Faroe—Flugga, Shetland. 17-18 November 1952. Figure 81.

A cursory comparison of this section with that over the Wyville Thomson Ridge (Figure 80), taken some ten days earlier, is sufficient to reveal an apparently radical change in the character of the oceanic water-mass which had taken place in the area between the Wyville Thomson Ridge region and the opening between Faroe and Shetland into the Norwegian Sea, where, in the third week of November, apparently considerable fresher water influence was encountered by the Atlantic Current, markedly restricting its cross-sectional area as defined by the 35·35‰ isohalines, in comparison with its similar representation on the earlier more southerly section. Its maximum temperature also had fallen from 10·70°C in the Wyville Thomson Ridge region in the beginning of the month to little more than 9½°C only two weeks later farther north.

Nevertheless, but with these circumstances in mind, three isolated, nuclear, salinities of 35·46‰, 35·43‰, and 35·41‰ in a water column of 35·33‰ to 35·37‰ salinity within the main Atlantic water-mass north-west of Shetland on 18 November, may possibly represent relics still of that Gulf of Gibraltar water intrusion which was observed on the contemporary southern section.

Relics of a different kind, namely, of intermediate Arctic water, appear to be indicated by the occurrence at 500 metres and below on the northern section of isolated salinities of 34·89‰ and 34·88‰ respectively within the bottom Norwegian Sea water-mass underlying the Atlantic mass. The minimum temperature of this disintegrated Arctic water-mass, as of the bottom Norwegian Sea water, was recorded at —0·88°C.

The year 1952, therefore, with ten cross-sections of the Faroe-Shetland Channel between the months of February and November inclusive, witnessed (1) only a single instance (in June) of surface Arctic water forming a substantial part of the deep water layer, (2) indications on all sections save two southern sections in May and November respectively of intermediate Arctic water in part occupation, up to approximately 50 per cent, of these deep layers—only once (in June), approaching total displacement of bottom Norwegian Sea water from these layers as frequently instanced in the three years preceding—and (3) definite evidence, by salinity, of nuclear Gulf of Gibraltar water in the upper layers of the oceanic water-mass, but, in this year, in a somewhat unusual position near Faroe Bank at an unusual time of the year, namely in November.

The Atlantic Current cores of the sections like those of 1951, were of consistently higher average salinity than those of the four years 1946 to 1950, and, again as in 1951, no evidence of heavy oceanic water was forthcoming in 1952.

Epochal Phenomena

Taking the seven post-war years as a group, and comparing them on broad lines with the group of ten pre-war years between 1927 and 1939 for which cross-sections of the Channel are available, their outstanding features, of course, in large-scale water-mass phenomena are, first, the strong infusion of Gulf of Gibraltar waters into the oceanic water-mass in the 1930's, with only isolated, sporadic occurrences of the phenomenon in the years before and since, and, second, by contrast, the apparent prevalence towards the end of the fifth and the beginning of the sixth decades, of not one, but two types of Arctic water-mass in the deeper levels of the Channel, sometimes wholly displacing bottom Norwegian Sea water from these levels, the latter having generally been looked upon hitherto as the normal water-mass occupying the deeper Channel layers, as it was in fact during the pre-war period of years.

A common feature discernible from the foregoing investigations in regard to both the above phenomena is that each embraced a number of years, apparently waxing during three or four years to maximum intensity in two consecutive years and waning thereafter for three or four years until only intermittent observations revealed relics of the respective incursions into the Channel region. In these circumstances, therefore, it would appear that the important phenomenon of marine climatic change is exemplified. Furthermore, in respect of the particular examples here demonstrated, it is to be observed that when the one was at maximum intensity in the Channel, the other was evidently absent. Thus, in the years 1933 and 1934, when Gulf of Gibraltar water occurred in greatest concentration and extension in the upper waters of the Channel, there was apparently no Arctic water present in the lower layers, and, *vice versa*, in 1949 and 1950, the years of maximum apparent intensity of the Arctic water-masses in the deep Channel, the uppermost waters were practically without trace of Gulf of Gibralter water.

The argument is in no way invalidated by the circumstance that Arctic water intrusion into the Channel was most in evidence, and occurred essentially, in the deeper levels, while Gulf of Gibraltar water was usually evidenced in the upper, oceanic, water-mass. The former, in that perhaps more significant part of it which intruded into the Channel when Arctic influence there was at about maximum intensity, almost certainly originated as an upper water phenomenon in latitudes north of the Channel, while the latter derived more or less immediately from that intermediate layer of extra-Mediterranean water which, between about 800 and 1200 metres, is characteristic of the North-Eastern Atlantic Ocean, its presence in the upper water layers north-west of Scotland being due to the effects of turbulence as seems so strikingly evident from Figure 16. There would appear, therefore, to be something in the nature of a complementary relationship between these two oppositely directed intrusions into the Faroe-Shetland Channel.

The Gulf of Gibraltar Water

Cooper and Vaux (1949) have designated the salinity of 35·50‰ as minimally indicative of Gulf of Gibraltar water in the Celtic Sea south-west of Ireland. While on the whole confirming this as a standard of reference also for the Faroe-Shetland Channel, the present investigations further suggest in relation to this region that isolated salinity values which are significantly above 35·43‰ may still denote Gulf of Gibraltar water influence in more or less attenuated form.

THE ATLANTIC CURRENT CORE

TABLE 5

The Atlantic Current Cores and Maximum Nuclear Salinities in the Faroe-Shetland Channel, 1946-1952.

Year	Month	FAROE BANK—BUTT OF LEWIS		FAROE—SHETLAND	
		Core Boundary Salinity, ‰	Maximum Nuclear Salinity, ‰	Core Boundary Salinity, ‰	Maximum Nuclear Salinity, ‰
1946 ..	July	—	—	35·30	35·37
	August	—	—	35·30	35·41
	October	—	—	35·30	35·41
1947 ..	June	35·35	35·43	35·35	35·42
	July	—	—	35·35	35·41
1948 ..	May	35·40	35·43	35·35	35·37
	June	35·35	35·43	—	—
	August	—	—	35·35	35·41
1949 ..	March	—	—	35·30	35·34
	May	35·30	35·34	—	—
	July	—	—	35·35	35·40
	Sept.	35·25	35·34	35·30	35·35
	Nov.	35·30	35·34	?	35·34
1950 ..	March	35·30	35·37	—	—
	May	35·30	35·39	35·30	35·41
	June	35·35	35·43	35·30	35·34
	”	—	—	35·35	35·41
	July	35·30	35·34	—	—
	August	—	—	35·30	35·38
	”	—	—	35·30	35·43
	Nov.	35·25	35·36	35·25	35·28
1951 ..	May	35·35	35·41	—	—
	June	35·35	35·44	35·35	35·39
	”	—	—	35·40	35·44
	July	35·30	35·38	35·30	35·35
	August	35·35	35·48	—	—
	Sept.	35·35	35·44	—	—
	Oct.	—	—	35·35	35·43
	Dec.	—	—	35·40	35·44
1952 ..	Feb.	—	—	35·40	35·41
	March	35·30	35·35	—	—
	May	35·40	35·43	35·35	35·42
	June	—	—	35·35	35·40
	”	—	—	35·35	35·36
	July	35·40	35·48	35·35	35·41
	Nov.	35·35	35·44	35·35	35·46

Table 5, summarising the data relative to the Atlantic Current cores of the post-war period of years, is complementary to Table 4 in respect of the period from 1927 to 1939. It is evident that to the three grades of boundary salinity conditions of Atlantic cores in Table 4, Table 5 adds two more of inferior salinity, namely 35·25‰ and 35·30‰, and in the post-war period the 35·45‰ salinity boundary did not appear as such. Once again, in these circumstances, there is implicit a suggestion of marine climatic change in the Faroe-Shetland Channel, in this instance relative to the "quality" of the Atlantic Current.

Practically the same average maximum nuclear salinities are associated with the two common boundary grades of Tables 4 and 5, namely, 35·42‰ or 35·41‰ with the 35·35‰ boundary, and 35·44‰ with that of 35·40‰. From Table 5 the values of 35·33‰ and 35·37‰ would appear to be the maximum nuclear salinities to be expected in conjunction with the two lowest grades respectively of boundary salinity conditions, namely 35·25‰ and 35·30‰.

Heavy Oceanic Water

Only one instance of probably cascaded heavy oceanic water, and that a relatively minor one compared with most of the ten instances of the pre-war period, was noticed in the depths of the Channel in more recent years, namely in May 1948.

Horizontal Tortional Current

Although less remarkable on the whole than the apparent example noticed in May 1931, a further instance of the probable functioning of an approximately horizontal tortional current through the body of the oceanic water-mass was observed in November 1949. On this occasion, the axis of the current, instead of being almost exactly level as in the previous instance, was evidently inclined upwards from about south-west to north-east in a gradient of approximately 1 in 3000.

Conclusion

In regard to each of the several phenomena which, in greater or less degree, have been elucidated in course of the foregoing study, the importance of systematic, intensive, and sustained observation of the characters involved can scarcely be over-emphasized. Doubtless also other characters should be included, the relations of which towards the main and primary purpose of these investigations are already to some extent realised. These almost elementary *modi operandi* are necessary to the end that adequate appreciation, which means quantitative assessment in most cases, of their geophysical significance in the first instance may be achieved. Granted these premises, there will still undoubtedly remain lacunae in the scientific understanding of at least some aspects of these phenomena, until fundamental marine physical principles and laws are more fully developed and established and indeed, in some directions, discovered. Such fundamental development and discovery, for which institutions throughout the world like the British National Institute of Oceanography accept the responsibility, must also, however, depend very materially upon the availability and the sufficiency of the raw data of observations, not merely to test under natural conditions, but even, in some measure at least, to evolve, the necessary principles and theories.

SUMMARY

The temperature, salinity, and specific volume distributions on sixty-nine cross-sections of the Faroe-Shetland Channel between 1927 and 1952 inclusive (excepting the six years 1940 to 1945), are examined dynamically and empirically. The sections were laid respectively across the threshold to the Channel (the Wyville Thomson Ridge) and approximately across its debouchment into the Norwegian Sea. From 1949 the former section was sometimes extended north-westward to between longitudes 9°W and 10°W; at the same time a short section due north of Faroe on longitude 6°35′W, to latitude 63°30′N, or 64°N, was occasionally introduced.

Forty-four of the cross-Channel sections were, within two weeks of each other, traversed in contemporary pairs. In all cases save one, which, however, is susceptible of rational explanation, more or less close agreement is recorded in respect of the volume transport of oceanic water (salinity $>34{\cdot}99‰$) north-eastward through the two sections.

The volume transports through all 69 sections range from 1·4 to 23·4 Km^3/hr., the mean value being 8·2, and the median, 7·0 Km^3/hr. respectively. The minimum was an early autumn (August 1927), and the maximum a mid-winter (December 1951), value. The former was registered two months before the phenomenal observation of an iceberg within the North Sea (October 1927). A penultimate maximum transport of 19·9 Km^3/hr. referred to the month of June 1947; this summer was noteworthy for extraordinarily high and prolonged summer conditions in Europe generally.

The summer assessments of the years 1931 to 1937 inclusive, except for 1937 which was just above the average, were below the mean value of 8·2 Km^3/hr., almost all below the first quartile value of 4·2 Km^3/hr.

Autumn-winter oceanic transports were measured in the years 1949 to 1952 inclusive and were in each case greater than the preceding spring-summer magnitudes, the majority exceeding the third quartile of about 12 Km^3/hr. The only spring-summer assessments conclusively exceeding this standard were those of 1929, 1947, and 1951.

The successive autumn-winter increases in oceanic volume transports apparently themselves increased in magnitude to a maximum in mid-winter 1951, indicative of climatic change in the sea relative to the strength of the Atlantic Current in the Faroe-Shetland Channel in the autumn-winter season.

Maximum sectional surface velocities, as computed, are shown in the majority of the many instances where the appropriate surface drift-bottle records exist, to agree more or less closely with the conventionally derived velocities from these records, thus demonstrating a practical correlation between two independent methods of current investigation.

The oceanic incursion into the Norwegian Sea by the *west* of Faroe Bank and the Faroe Islands, hitherto generally conceived as of relatively small, almost insignificant, magnitude in comparison with the main flow through the Faroe-Shetland Channel, is nevertheless estimated to have been about one fourth of the latter on four occasions (March, May, July, and September) in 1949, and once (March), in 1950, this ratio obtaining for main Channel oceanic progressions ranging from about 5 to nearly 16 Km^3/hr. Circumstantially less reliable ratios for the spring-summer months of 1950 were 1:2, 1:1, and 1:20. Equality of oceanic water-mass progression north to north-eastward on either side latitudinally of the Faroe Islands, was again indicated in July 1952, and a 1:3 ratio estimated for the month of March in the same year; but the surprising result of the *main* oceanic progression into the Norwegian Sea by the *west* of Faroe, in the ratio of almost 2·5:1 in relation to the contemporary through-Channel flow, was calculated in respect of at least a brief period in May 1951.

Other aspects of the hydrography of the Faroe-Shetland Channel of a dynamic character, which are indicated in the empirical examination of sectional temperature and salinity distributions are (i) the occasional operation (May 1931 and November 1949) of an approximately horizontal tortional current through the oceanic water-mass, (ii) the disintegration, by impingement on the southern slope of the Wyville Thomson Ridge, of a low level Gulf of Gibraltar water-mass, resulting in a random scattering

of high salinity (and density) nuclei in the upper, oceanic, water-mass, and (iii) the severance, apparently by rapid cooling and consequent increase in density, of small bodies of oceanic water from the underside of the "parent" mass, resulting in subsequent location of sub-zero temperature, oceanic salinity (>34·99‰), water on or near the bottom of the Channel proper.

In cross-section, the core of the oceanic water-mass, as borne by the Atlantic Current through the Faroe-Shetland Channel, is shown to be bounded by one or another of the five isohalines of 35·25‰ to 35·45‰ in successive intervals of 0·05‰. With these five definitive boundary salinities are associated five distinctive maximum nuclear salinities of about 35·33‰, 35·37‰, 35·41‰, 35·44‰, and 35·48‰. Variation in these conditions with time is indicative of marine climatic change, in respect, in this instance, of the "quality" of the oceanic water-mass.

Other evidence of marine climatic change in Faroe-Shetland Channel waters derives from the empirically noted variations in the amounts of Gulf of Gibraltar water in the oceanic water-mass, and of Arctic water in the deep layers of the Channel. The presence of the former seems specifically to be designated by salinities of 35·50‰ and over, although slightly lesser values may, according to circumstances, denote such water in attenuated form.

From only the most infrequent and sporadic evidence of the phenomenon prior to the fourth decade of the present century, similar conditions having obtained also since, the years 1930 to 1939 inclusive evidently witnessed a cycle of (i) the approach, in 1930, of the intermediate level Gulf of Gibraltar water-mass towards the Faroe-Shetland Channel, (ii) its entry thereto (1931) as an intrusion, by disintegration, into the oceanic water-mass, to (iii) maximum concentration therein in 1933-1934, (iv) gradual recession of the intrusion after 1934, until (v) its total disappearance from the region in 1939.

A similar, cyclic, character, again indicative of marine climatic change, is attributed to the intrusion into the depths of the Channel in the second half of the fifth and the earliest years of the sixth decades, of, first one (salinity 34·85‰ to 34·89‰), and then another (salinity 34·77‰ to 34·84‰), type of Arctic water-mass, to the total displacement, at the peak of the phenomenon in 1949-1950, of the normal bottom water-mass of the Channel, namely, bottom Norwegian Sea water of salinity 34·90‰ to 34·94‰.

Still another water-mass, of salinity 34·95‰ to 34·99‰, which may occasionally intrude into the deeper Channel levels and, as apparently in June 1935, constitute almost the exclusive bottom water-mass of the region, it is suggested should be specifically recognised as a sub-oceanic water-mass formed by turbulent admixture of the oceanic and bottom Norwegian Sea water-masses.

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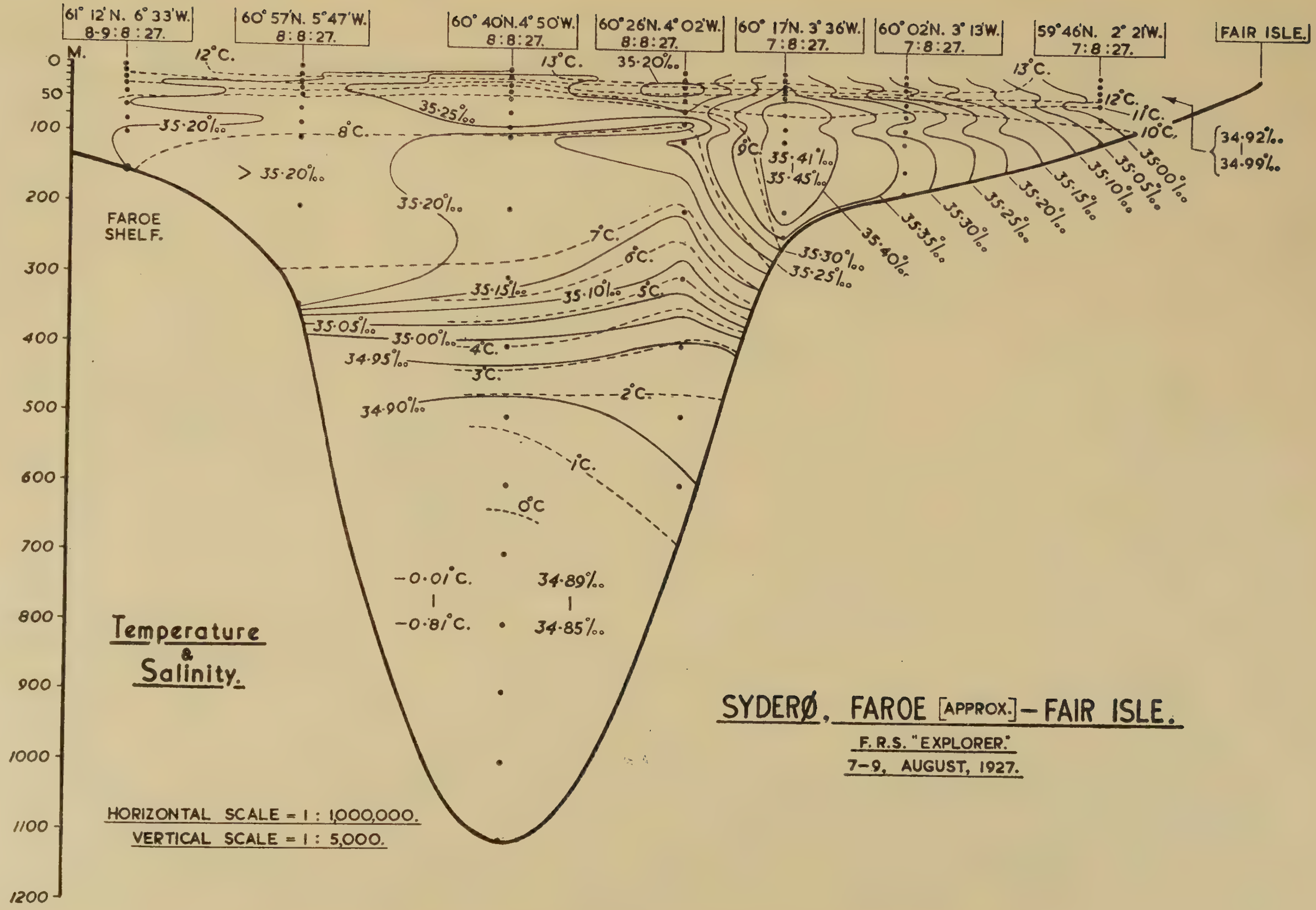
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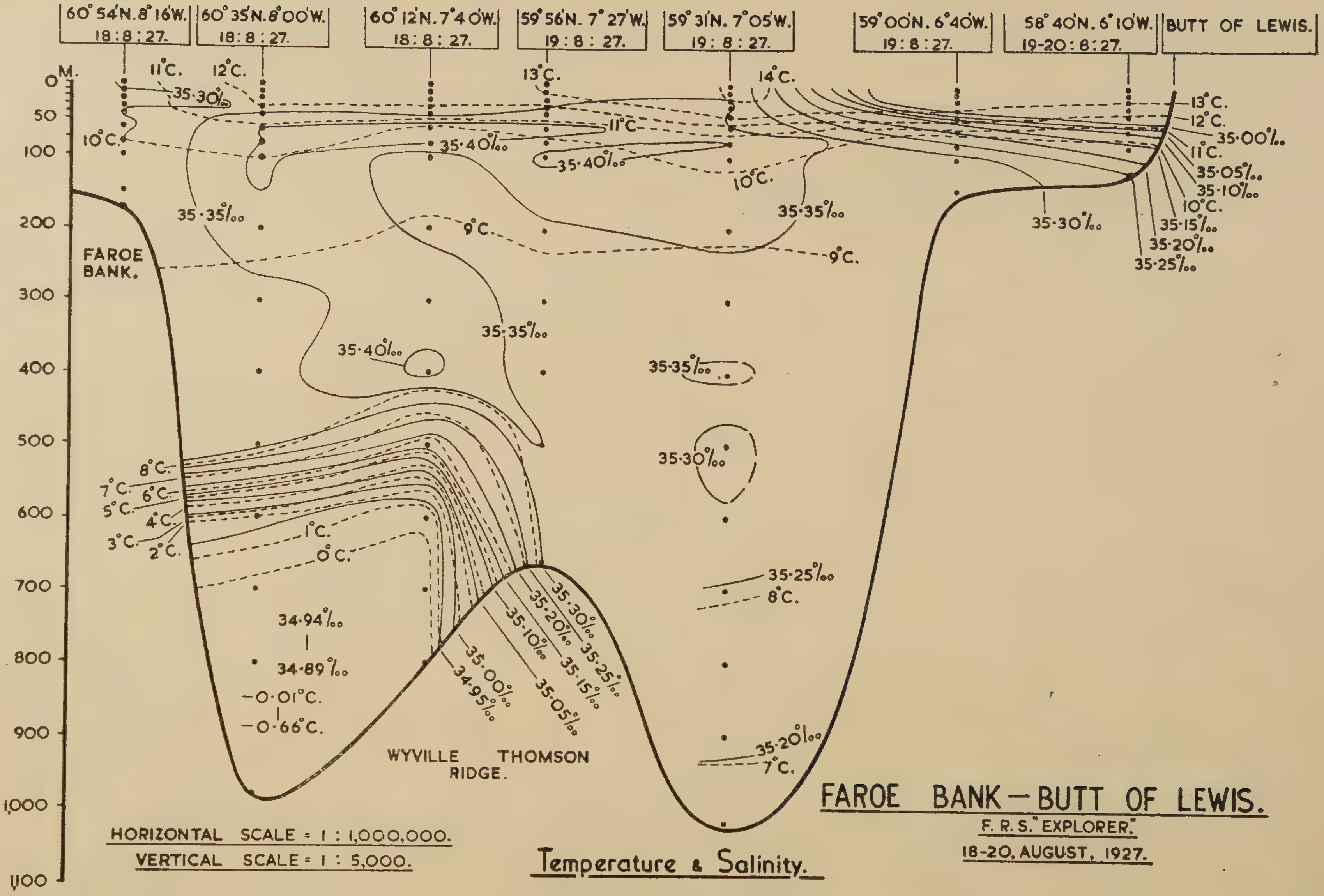
60° 17'N. 3° 36'W. 7:8:27.
60° 02'N. 3° 13'W. 7:8:27.
59° 46'N. 2° 21'W. 7:8:27.
FAIR ISLE.
M.
0
50
100
200
300
400
500
600
700
800
900
1000
1100
1200
12°C.
13°C.
35·20‰
13°C.
12°C.
11°C.
10°C.
34·92‰ – 34·99‰
35·25‰
35·20‰
8°C.
9°C.
35·41‰ – 35·45‰
35·00‰
35·05‰
35·10‰
35·15‰
35·20‰
35·25‰
35·30‰
35·35‰
35·40‰
35·30‰
35·25‰
> 35·20‰
35·20‰
FAROE SHELF.
7°C.
6°C.
35·15‰
35·10‰
5°C.
35·05‰
35·00‰
4°C.
34·95‰
3°C.
34·90‰
2°C.
1°C.
0°C
−0·01°C. – −0·81°C.
34·89‰ – 34·85‰
Temperature & Salinity.
SYDERØ, FAROE [APPROX.] – FAIR ISLE.
F. R. S. "EXPLORER."
7–9, AUGUST, 1927.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.

Fig. 8


FAROE BANK—BUTT OF LEWIS.

F. R. S. "EXPLORER."

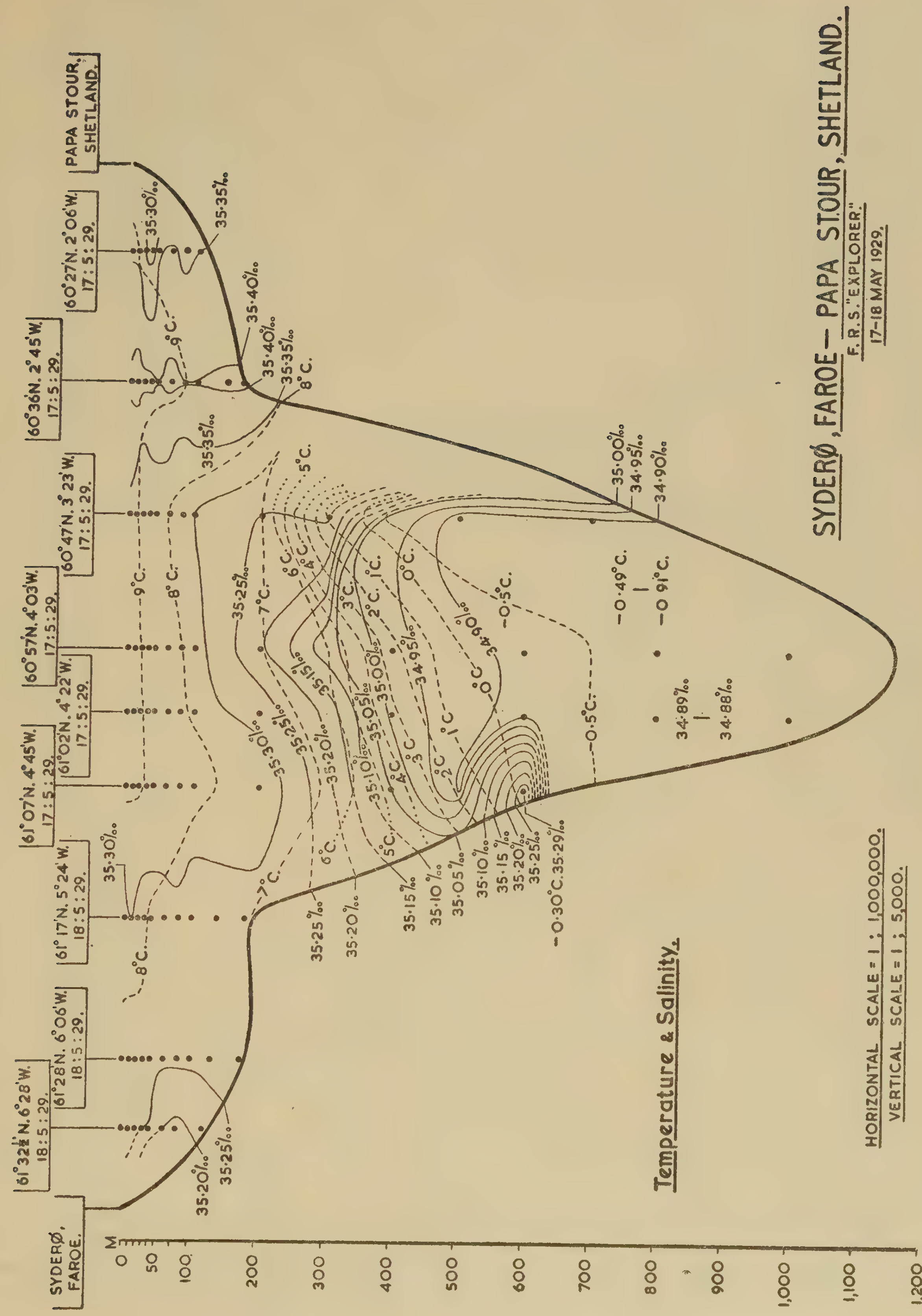
18-20, AUGUST, 1927.

Temperature & Salinity.

HORIZONTAL SCALE = 1 : 1,000,000.

VERTICAL SCALE = 1 : 5,000.

Fig. 9



SYDERØ, FAROE — PAPA STOUR, SHETLAND.
F. R. S. "EXPLORER."
17–18 MAY 1929.

Fig. 10

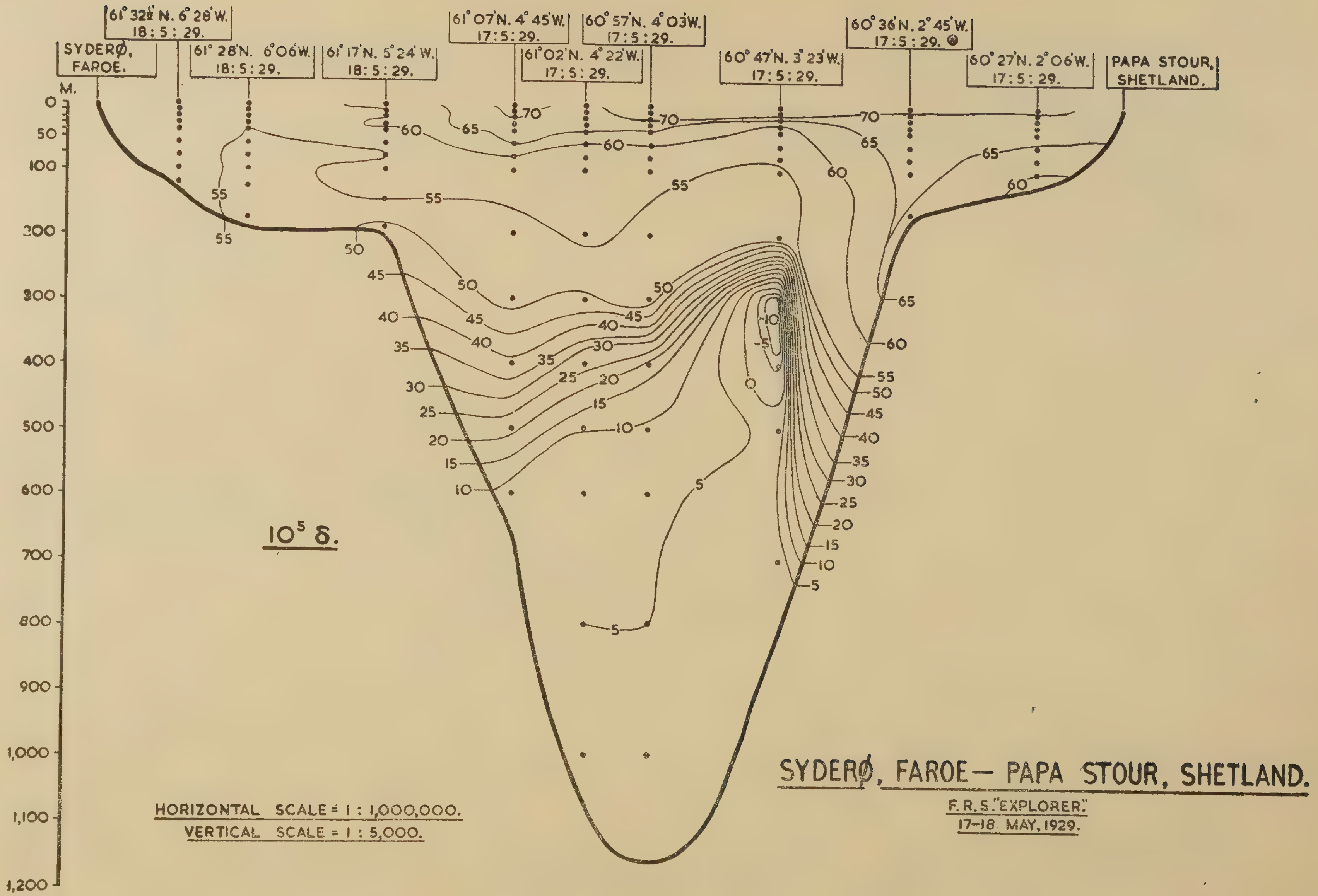
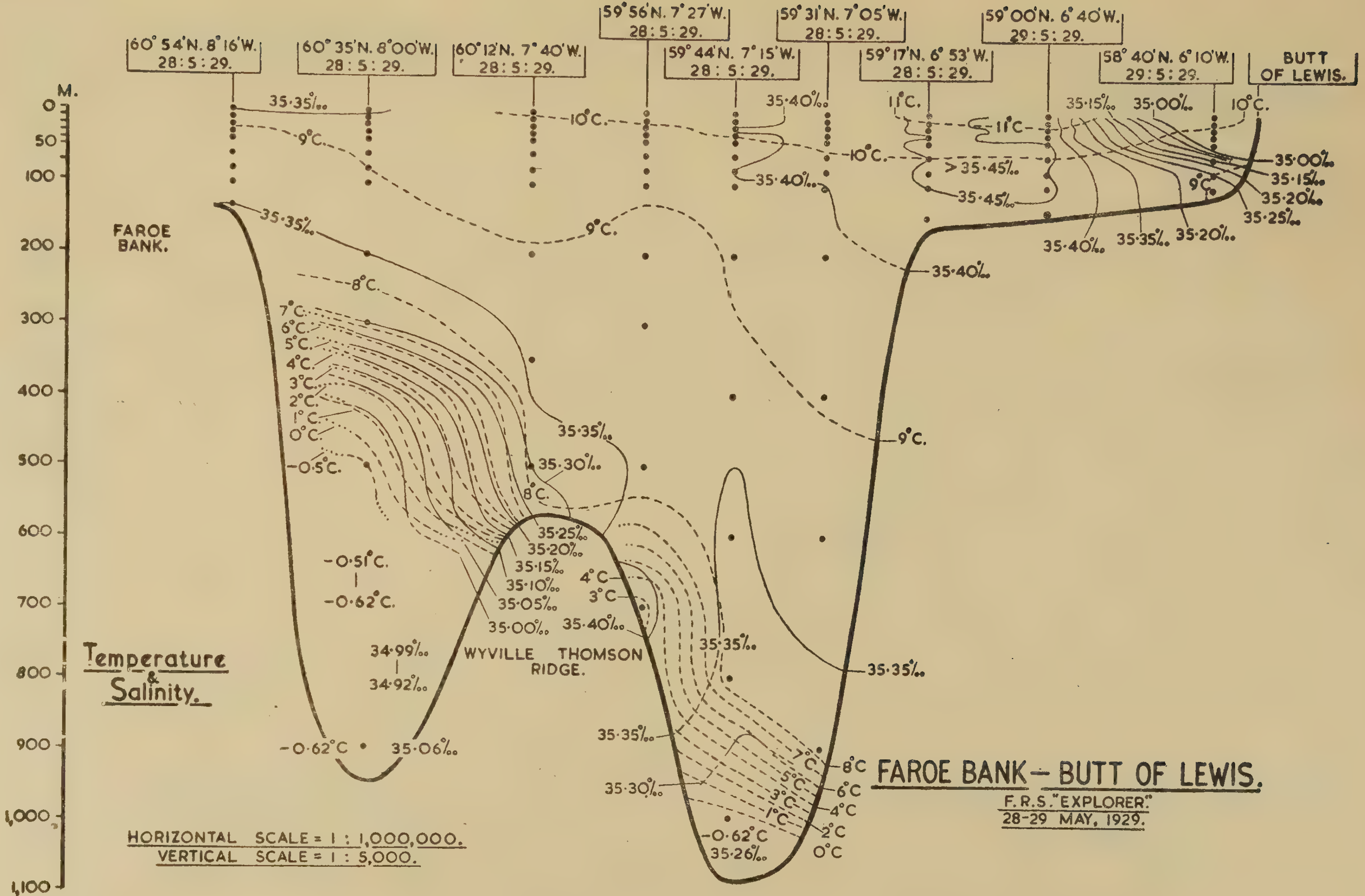

SYDERØ, FAROE— PAPA STOUR, SHETLAND.
F.R.S."EXPLORER."
17–18 MAY, 1929.
10⁵ δ.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
SYDERØ, FAROE.
61° 32½' N. 6° 28' W. 18 : 5 : 29.
61° 28' N. 6° 06' W. 18 : 5 : 29.
61° 17' N. 5° 24' W. 18 : 5 : 29.
61° 07' N. 4° 45' W. 17 : 5 : 29.
61° 02' N. 4° 22' W. 17 : 5 : 29.
60° 57' N. 4° 03' W. 17 : 5 : 29.
60° 47' N. 3° 23' W. 17 : 5 : 29.
60° 36' N. 2° 45' W. 17 : 5 : 29.
60° 27' N. 2° 06' W. 17 : 5 : 29.
PAPA STOUR, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
-5
-10

FIG. 10A


FAROE BANK — BUTT OF LEWIS.
F.R.S. "EXPLORER."
28-29 MAY, 1929.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
M.
0
50
100
200
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400
500
600
700
800
900
1,000
1,100
60° 54'N. 8° 16'W. 28 : 5 : 29.
60° 35'N. 8° 00'W. 28 : 5 : 29.
60° 12'N. 7° 40'W. 28 : 5 : 29.
59° 56'N. 7° 27'W. 28 : 5 : 29.
59° 44'N. 7° 15'W. 28 : 5 : 29.
59° 31'N. 7° 05'W. 28 : 5 : 29.
59° 17'N. 6° 53'W. 28 : 5 : 29.
59° 00'N. 6° 40'W. 29 : 5 : 29.
58° 40'N. 6° 10'W. 29 : 5 : 29.
BUTT OF LEWIS.
FAROE BANK.
WYVILLE THOMSON RIDGE.
35·35‰
9°C.
10°C.
11°C.
35·40‰
>35·45‰
35·45‰
35·15‰
35·00‰
35·20‰
35·25‰
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
−0·5°C.
35·30‰
35·10‰
35·05‰
−0·51°C.
−0·62°C.
34·99‰
34·92‰
−0·62°C
35·06‰
35·26‰

FIG. 11

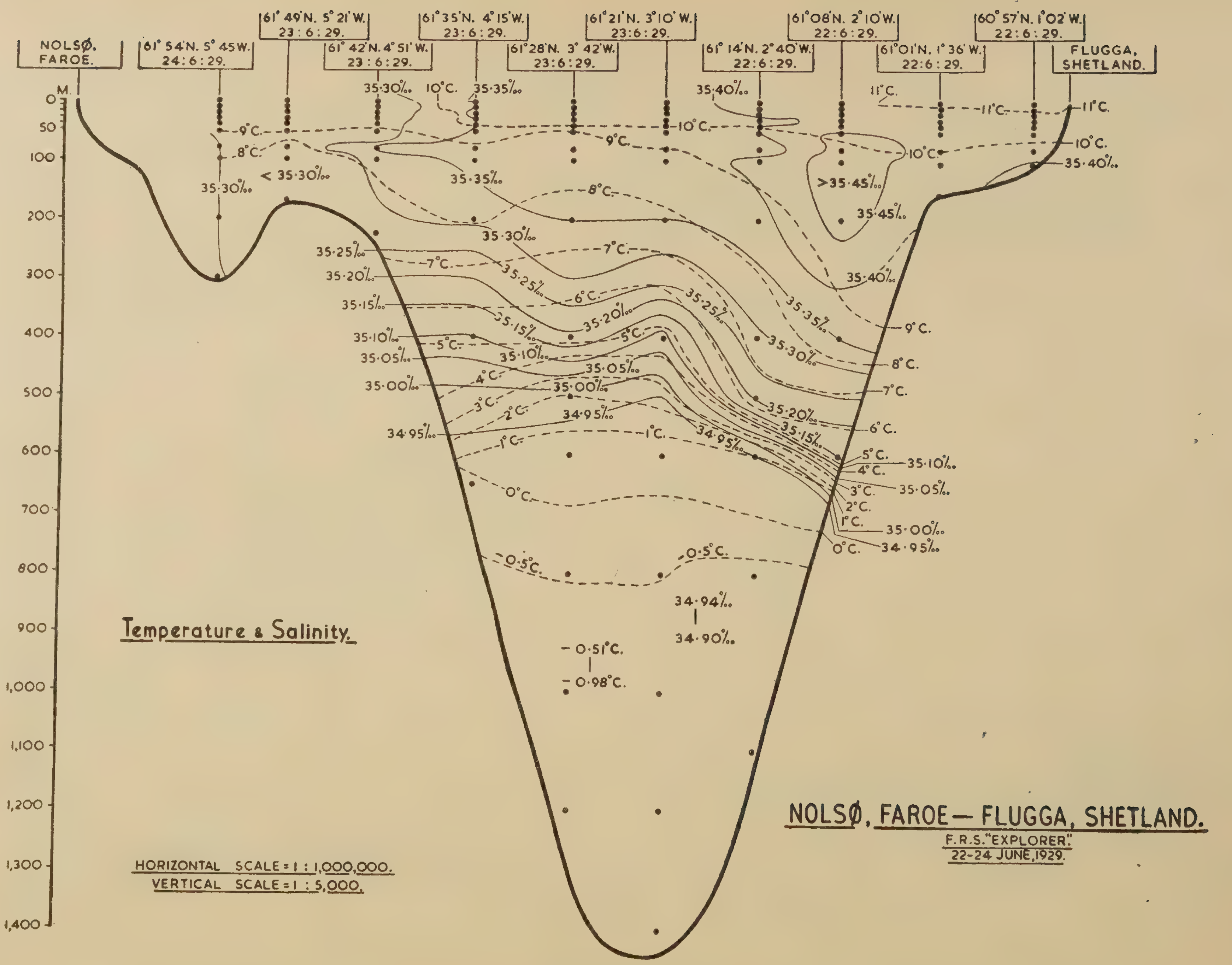

NOLSØ. FAROE.
61° 54'N. 5° 45'W. 24:6:29.
61° 49'N. 5° 21'W. 23:6:29.
61° 42'N. 4° 51'W. 23:6:29.
61° 35'N. 4° 15'W. 23:6:29.
61° 28'N. 3° 42'W. 23:6:29.
61° 21'N. 3° 10'W. 23:6:29.
61° 14'N. 2° 40'W. 22:6:29.
61° 08'N. 2° 10'W. 22:6:29.
61° 01'N. 1° 36'W. 22:6:29.
60° 57'N. 1° 02'W. 22:6:29.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
1,400
11°C.
10°C.
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
-0.5°C.
-0.51°C.
-0.98°C.
35·45‰
>35·45‰
35·40‰
35·35‰
35·30‰
< 35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·94‰
34·90‰
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE — FLUGGA, SHETLAND.
F.R.S. "EXPLORER."
22-24 JUNE, 1929.

FIG. 12

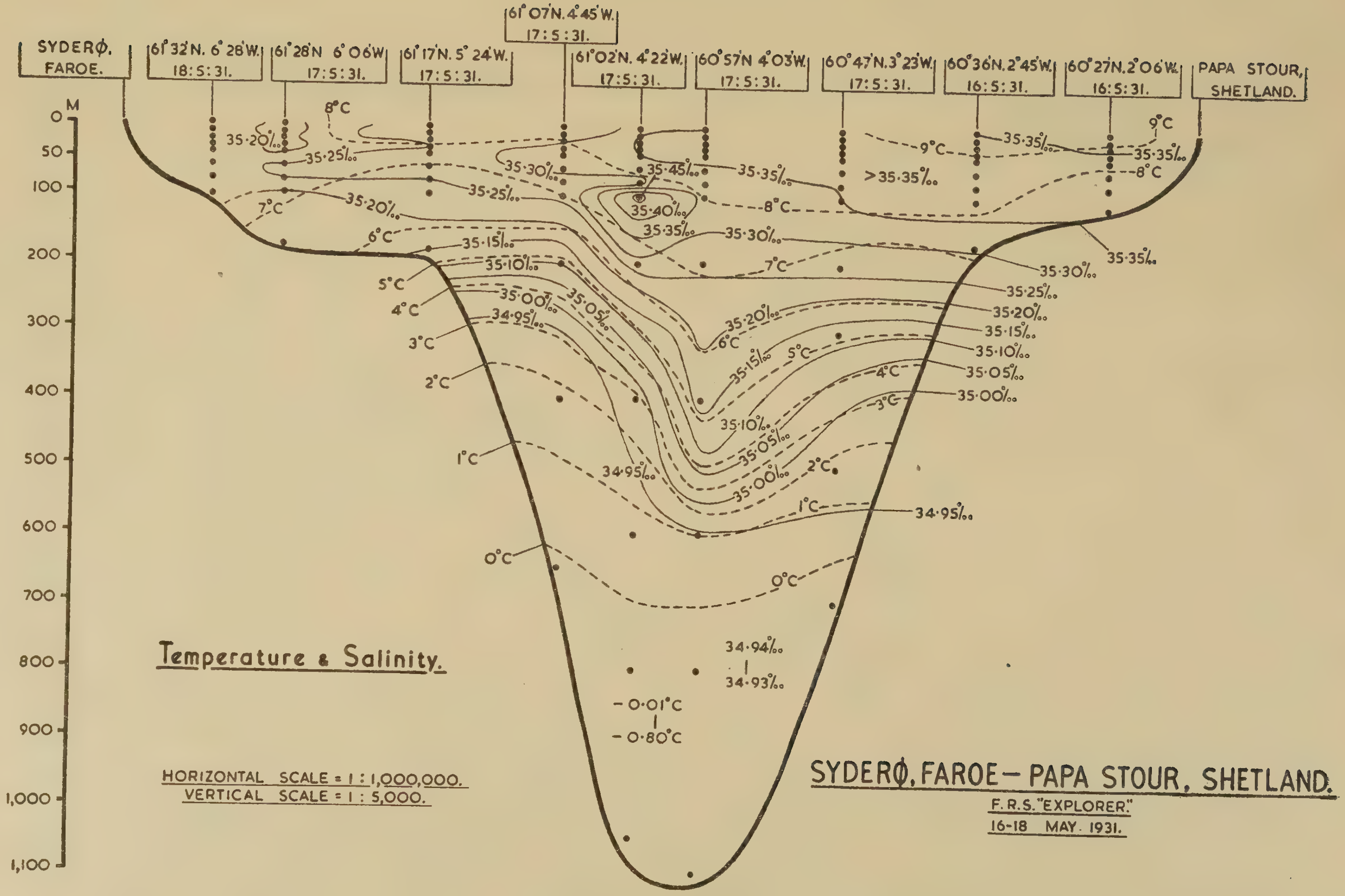

SYDERØ, FAROE — PAPA STOUR, SHETLAND.
F.R.S. "EXPLORER."
16-18 MAY. 1931.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
SYDERØ. FAROE.
61° 32'N. 6° 28'W. 18:5:31.
61° 28'N 6° 06'W 17:5:31.
61° 17'N. 5° 24'W. 17:5:31.
61° 07'N. 4° 45'W. 17:5:31.
61° 02'N. 4° 22'W. 17:5:31.
60° 57'N 4° 03'W. 17:5:31.
60° 47'N. 3° 23'W. 17:5:31.
60° 36'N. 2° 45'W. 16:5:31.
60° 27'N. 2° 06'W. 16:5:31.
PAPA STOUR, SHETLAND.
M
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
9°C
8°C
7°C
6°C
5°C
4°C
3°C
2°C
1°C
0°C
35·45‰
35·40‰
35·35‰
>35·35‰
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·94‰ – 34·93‰
−0·01°C – −0·80°C

Fig. 13

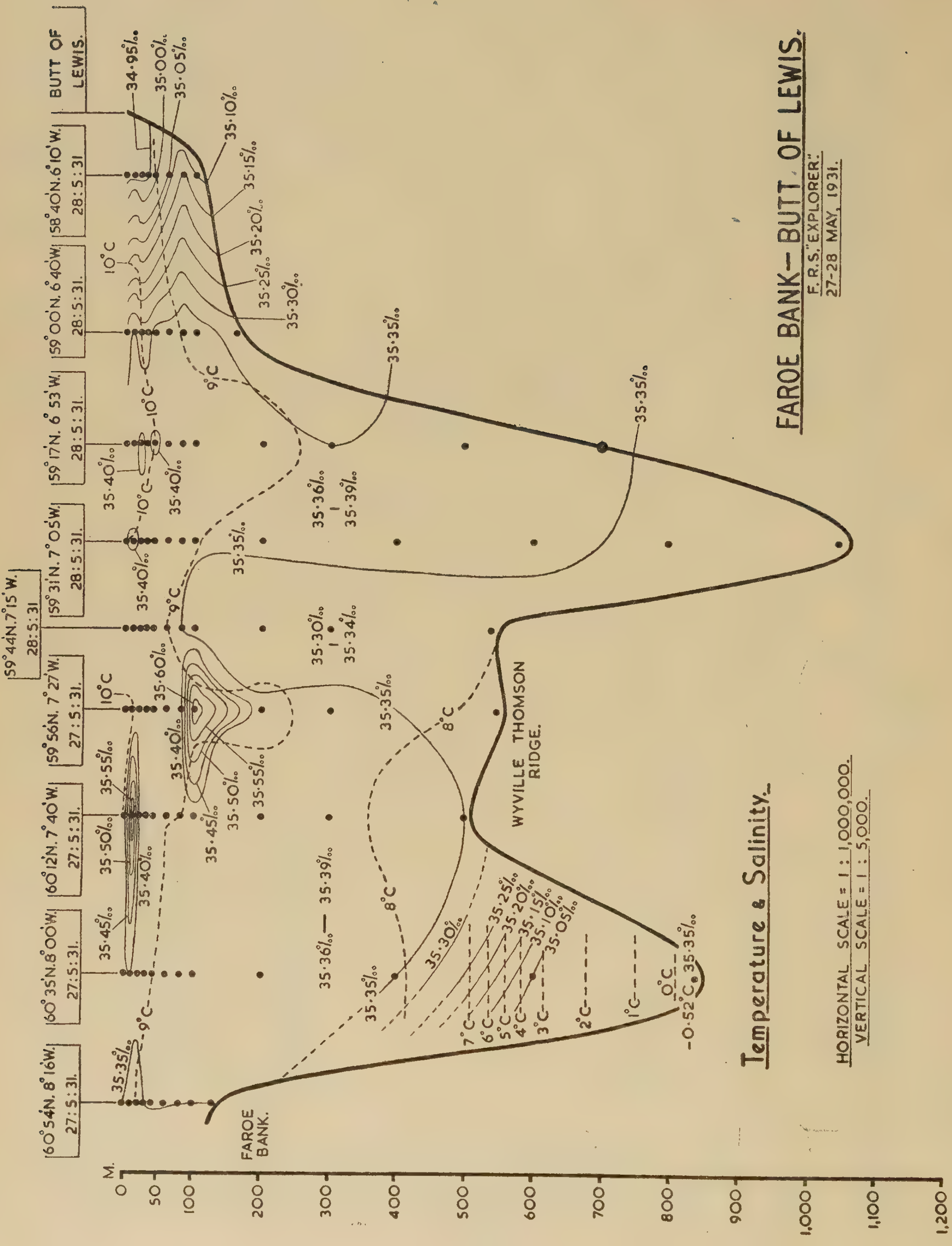

FAROE BANK—BUTT OF LEWIS.
F. R. S. "EXPLORER."
27-28 MAY, 1931.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
60°54'N. 8°16'W. 27:5:31.
60°35'N. 8°00'W. 27:5:31.
60°12'N. 7°40'W. 27:5:31.
59°56'N. 7°27'W. 27:5:31.
59°44'N. 7°15'W. 28:5:31
59°31'N. 7°05'W. 28:5:31.
59°17'N. 6°53'W. 28:5:31.
59°00'N. 6°40'W. 28:5:31.
58°40'N. 6°10'W. 28:5:31
BUTT OF LEWIS.
FAROE BANK.
WYVILLE THOMSON RIDGE.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
34·95‰
35·00‰
35·05‰
35·10‰
35·15‰
35·20‰
35·25‰
35·30‰
35·35‰
35·36‰ – 35·39‰
35·40‰
35·45‰
35·50‰
35·55‰
35·60‰
35·30‰ – 35·34‰
35·36‰ — 35·39‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
10°C
9°C
8°C
7°C
6°C
5°C
4°C
3°C
2°C
1°C
0°C
-0·52°C
35·35‰

Fig. 14

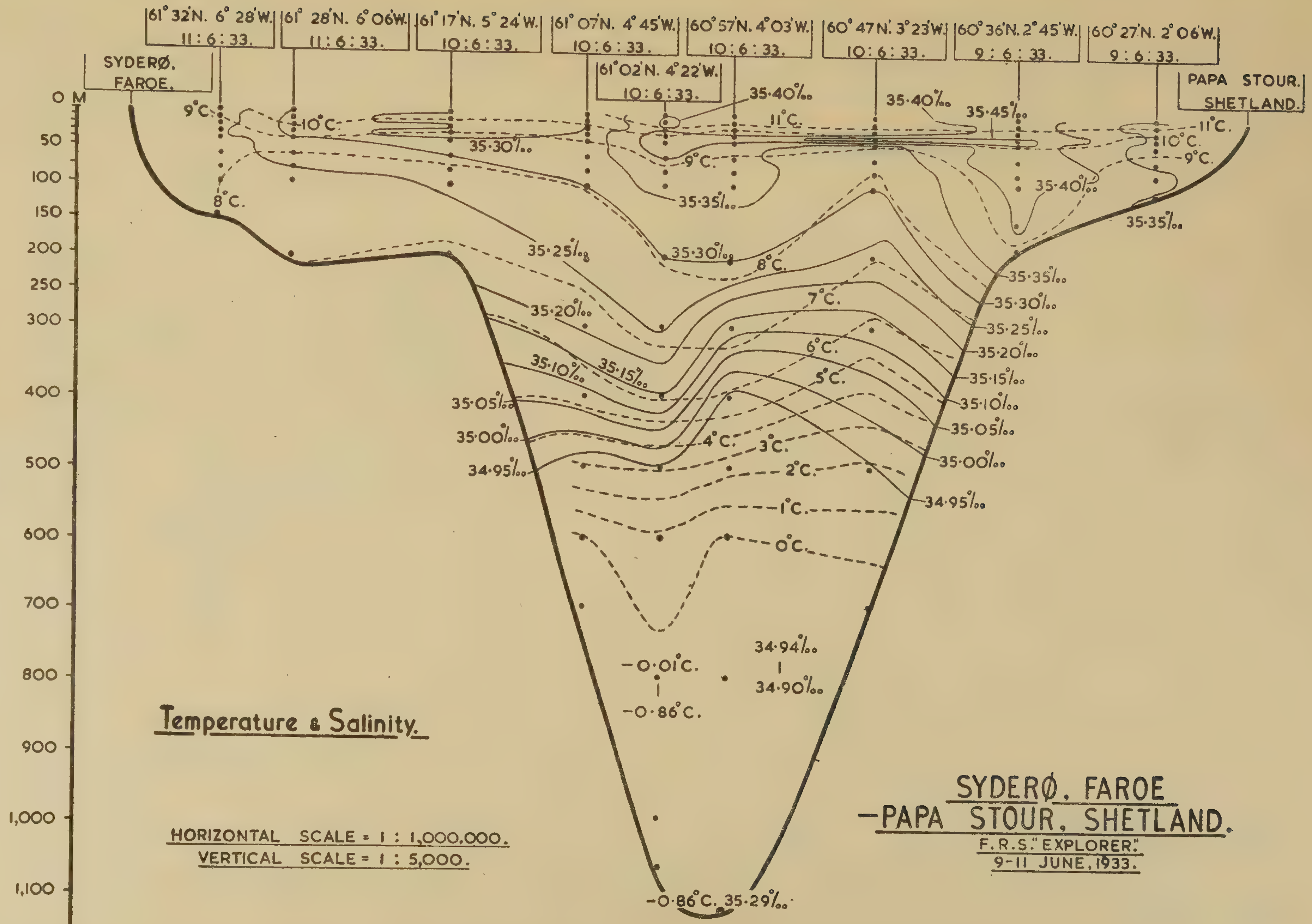

SYDERØ, FAROE
—PAPA STOUR, SHETLAND.
F.R.S. "EXPLORER."
9-11 JUNE, 1933.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
SYDERØ, FAROE.
PAPA STOUR, SHETLAND.
61° 32'N. 6° 28'W. 11 : 6 : 33.
61° 28'N. 6° 06'W. 11 : 6 : 33.
61° 17'N. 5° 24'W. 10 : 6 : 33.
61° 07'N. 4° 45'W. 10 : 6 : 33.
61° 02'N. 4° 22'W. 10 : 6 : 33.
60° 57'N. 4° 03'W. 10 : 6 : 33.
60° 47'N. 3° 23'W. 10 : 6 : 33.
60° 36'N. 2° 45'W. 9 : 6 : 33.
60° 27'N. 2° 06'W. 9 : 6 : 33.
0 M
50
100
150
200
250
300
400
500
600
700
800
900
1,000
1,100
1,200
9°C.
10°C.
11°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
35·45‰
35·40‰
35·35‰
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
-0·01°C. - -0·86°C.
34·94‰ - 34·90‰
-0·86°C. 35·29‰

FIG. 15

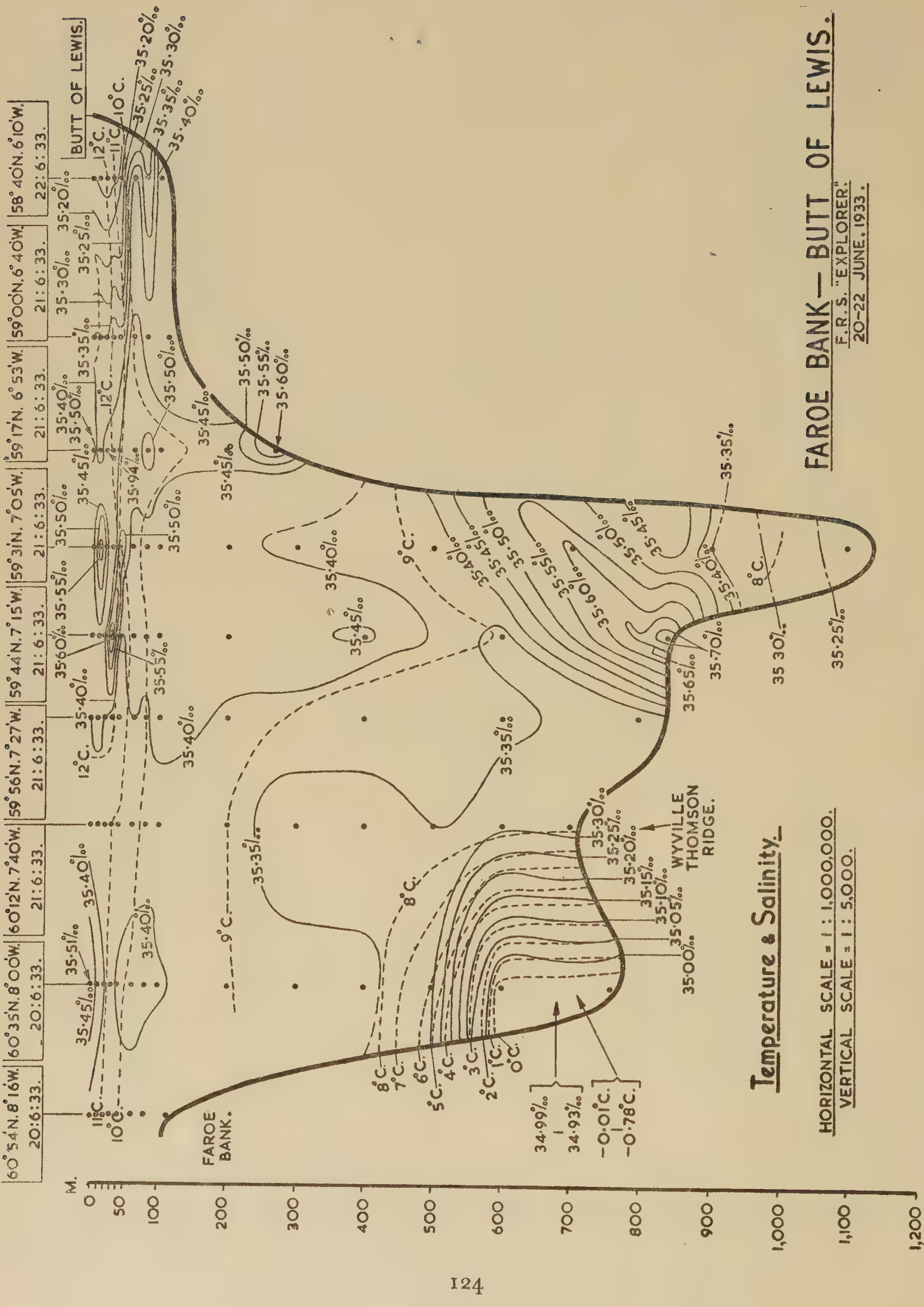

FAROE BANK — BUTT OF LEWIS.
F. R. S. "EXPLORER."
20–22 JUNE, 1933.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
60° 54'N. 8° 16'W. 20:6:33.
60° 35'N. 8° 00'W. 20:6:33.
60° 12'N. 7° 40'W. 21:6:33.
59° 56'N. 7° 27'W. 21:6:33.
59° 44'N. 7° 15'W. 21:6:33.
59° 31'N. 7° 05'W. 21:6:33.
59° 17'N. 6° 53'W. 21:6:33.
59° 00'N. 6° 40'W. 21:6:33.
58° 40'N. 6° 10'W. 22:6:33.
BUTT OF LEWIS.
FAROE BANK.
WYVILLE THOMSON RIDGE.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
34·99‰ – 34·93‰
-0·01°C. – -0·78°C.
11°C.
10°C.
12°C.
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
35·51‰
35·45‰
35·40‰
35·35‰
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
35·60‰
35·55‰
35·50‰
35·94‰
35·65‰
35·70‰
35·35‰
35·30‰
35·25‰

Fig. 16

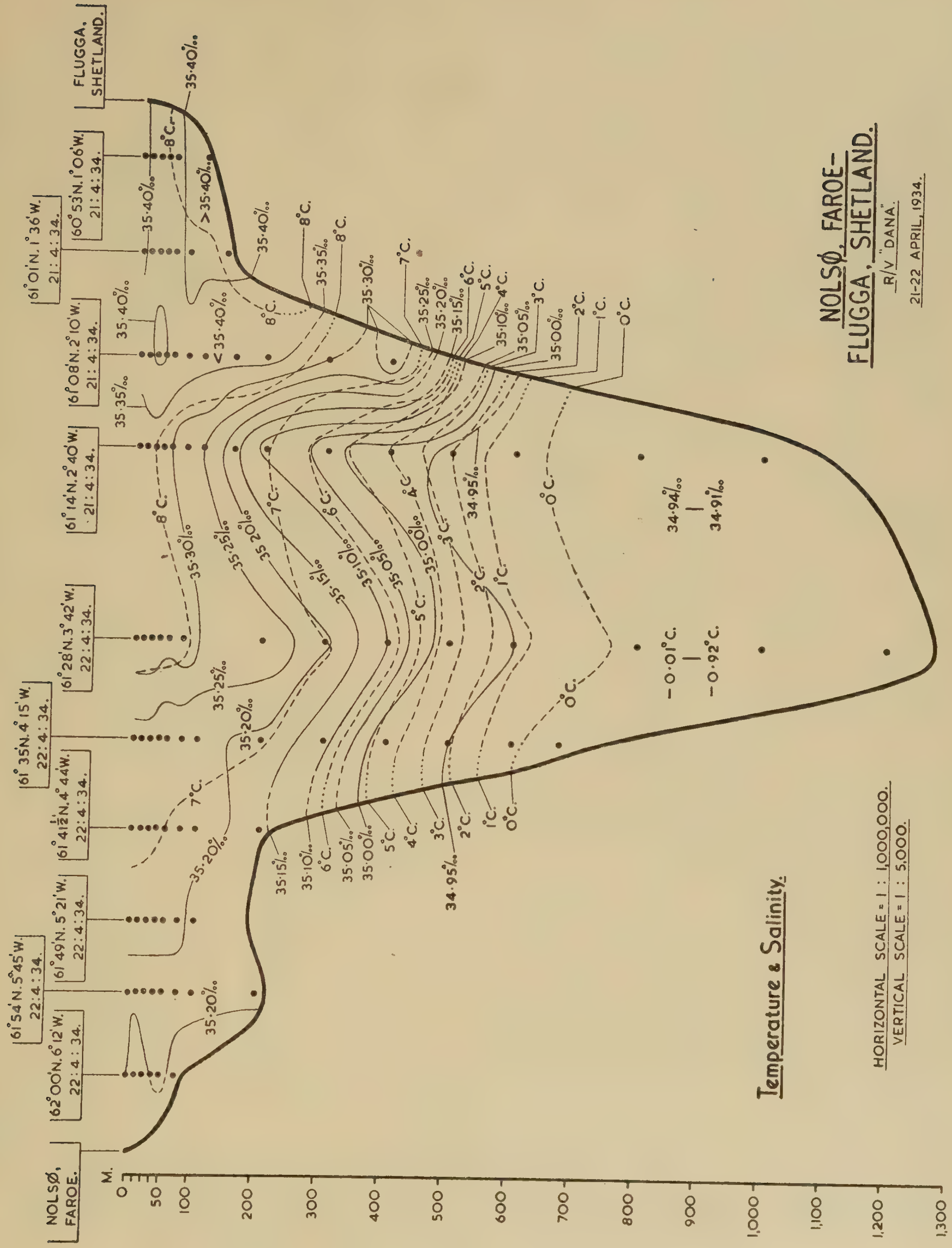

NOLSØ, FAROE-
FLUGGA, SHETLAND.
R/V "DANA."
21-22 APRIL, 1934.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE.
FLUGGA, SHETLAND.
62°00'N. 6°12'W. 22 : 4 : 34.
61°54'N. 5°45'W. 22 : 4 : 34.
61°49'N. 5°21'W. 22 : 4 : 34.
61°41½'N. 4°44'W. 22 : 4 : 34.
61°35'N. 4°15'W. 22 : 4 : 34.
61°28'N. 3°42'W. 22 : 4 : 34.
61°14'N. 2°40'W. 21 : 4 : 34.
61°08'N. 2°10'W. 21 : 4 : 34.
61°01'N. 1°36'W. 21 : 4 : 34.
60°53'N. 1°06'W. 21 : 4 : 34.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
35·40‰
>35·40‰
<35·40‰
35·35‰
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·94‰
34·91‰
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
−0·01°C.
−0·92°C.

FIG. 17

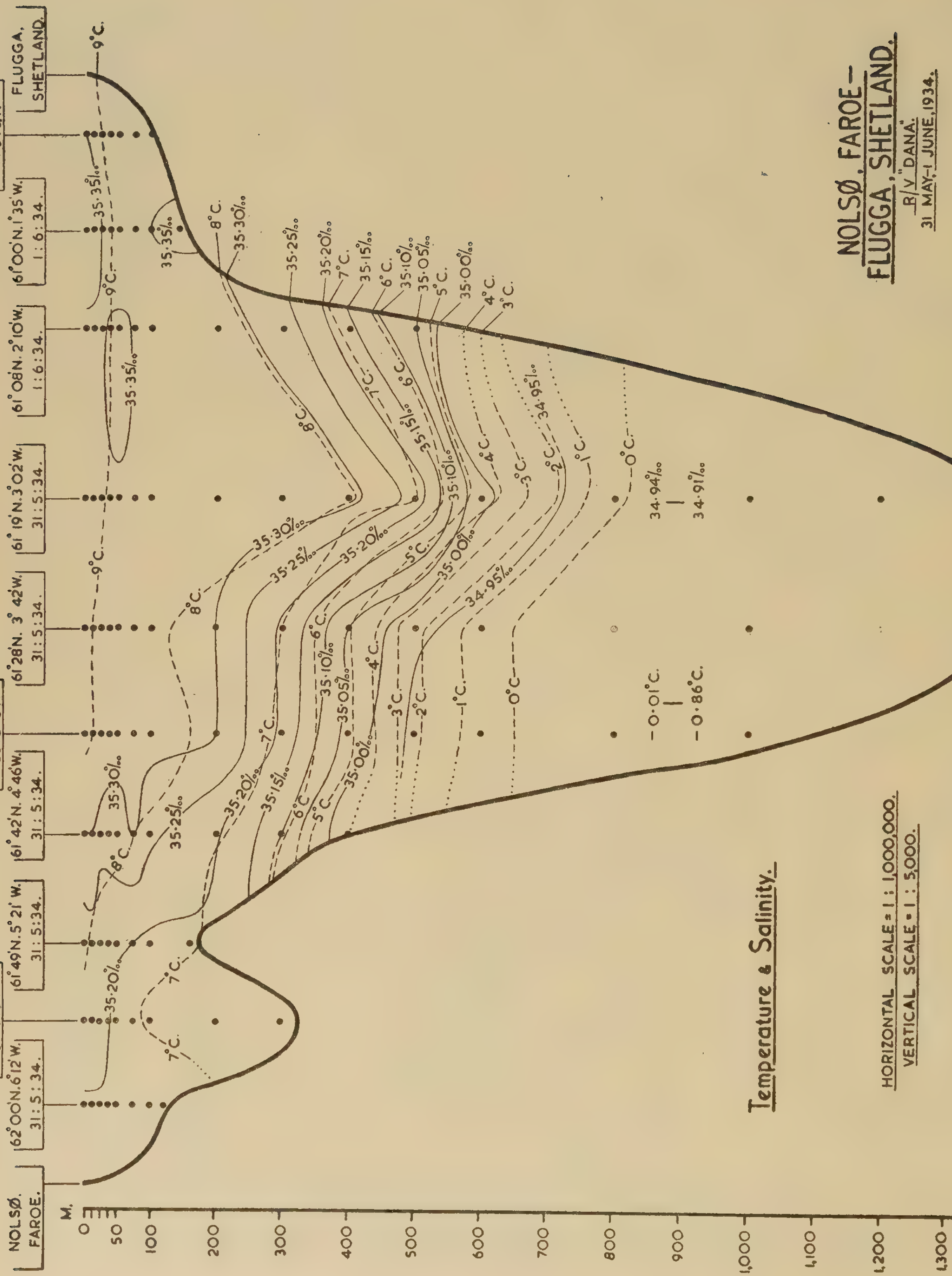

NOLSØ, FAROE—
FLUGGA, SHETLAND.
R/V "DANA."
31 MAY–1 JUNE, 1934.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ. FAROE.
62°00'N. 6°12'W. 31 : 5 : 34.
61°54½'N. 5°45'W. 31 : 5 : 34.
61°49'N. 5°21'W. 31 : 5 : 34.
61°42'N. 4°46'W. 31 : 5 : 34.
61°35'N. 4°15'W. 35 : 5 : 34.
61°28'N. 3°42'W. 31 : 5 : 34.
61°19'N. 3°02'W. 31 : 5 : 34.
61°08'N. 2°10'W. 1 : 6 : 34.
61°00'N. 1°35'W. 1 : 6 : 34.
60°53'N. 1°06'W. 1 : 6 : 34.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
1,400
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
35·35‰
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·94‰
34·91‰
−0·01°C.
−0·86°C.

Fig. 18

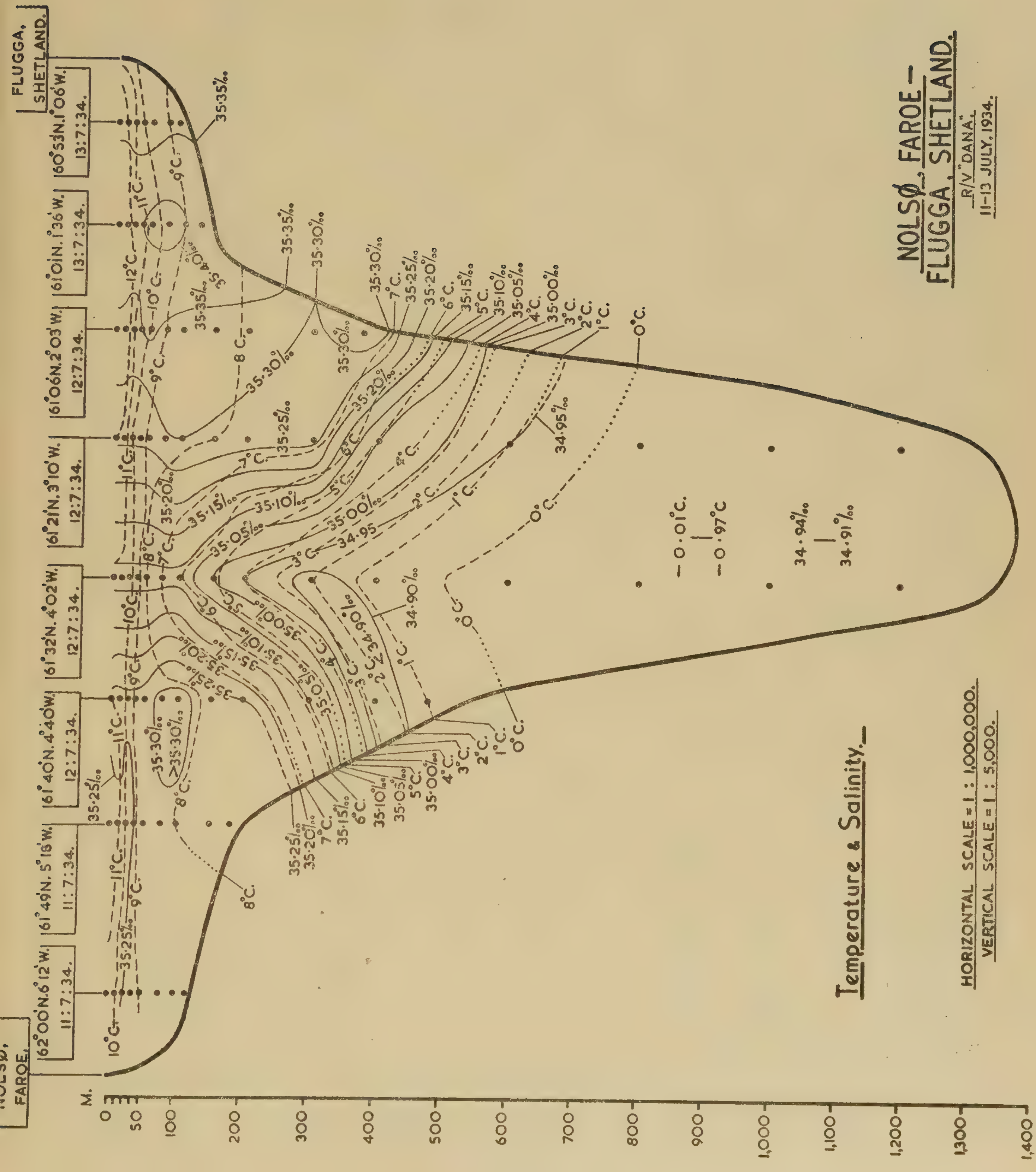
NOLSØ, FAROE — FLUGGA, SHETLAND.
R/V "DANA".
11–13 JULY, 1934.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE.
FLUGGA, SHETLAND.
62°00'N. 6°12'W. 11:7:34.
61°49'N. 5°18'W. 11:7:34.
61°40'N. 4°40'W. 12:7:34.
61°32'N. 4°02'W. 12:7:34.
61°21'N. 3°10'W. 12:7:34.
61°06'N. 2°03'W. 12:7:34.
61°01'N. 1°36'W. 13:7:34.
60°53'N. 1°06'W. 13:7:34.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
1,400
10°C.
11°C.
12°C.
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
35·35‰
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·90‰
>35·30‰
−0·01°C.
−0·97°C.
34·94‰
34·91‰

Fig. 19

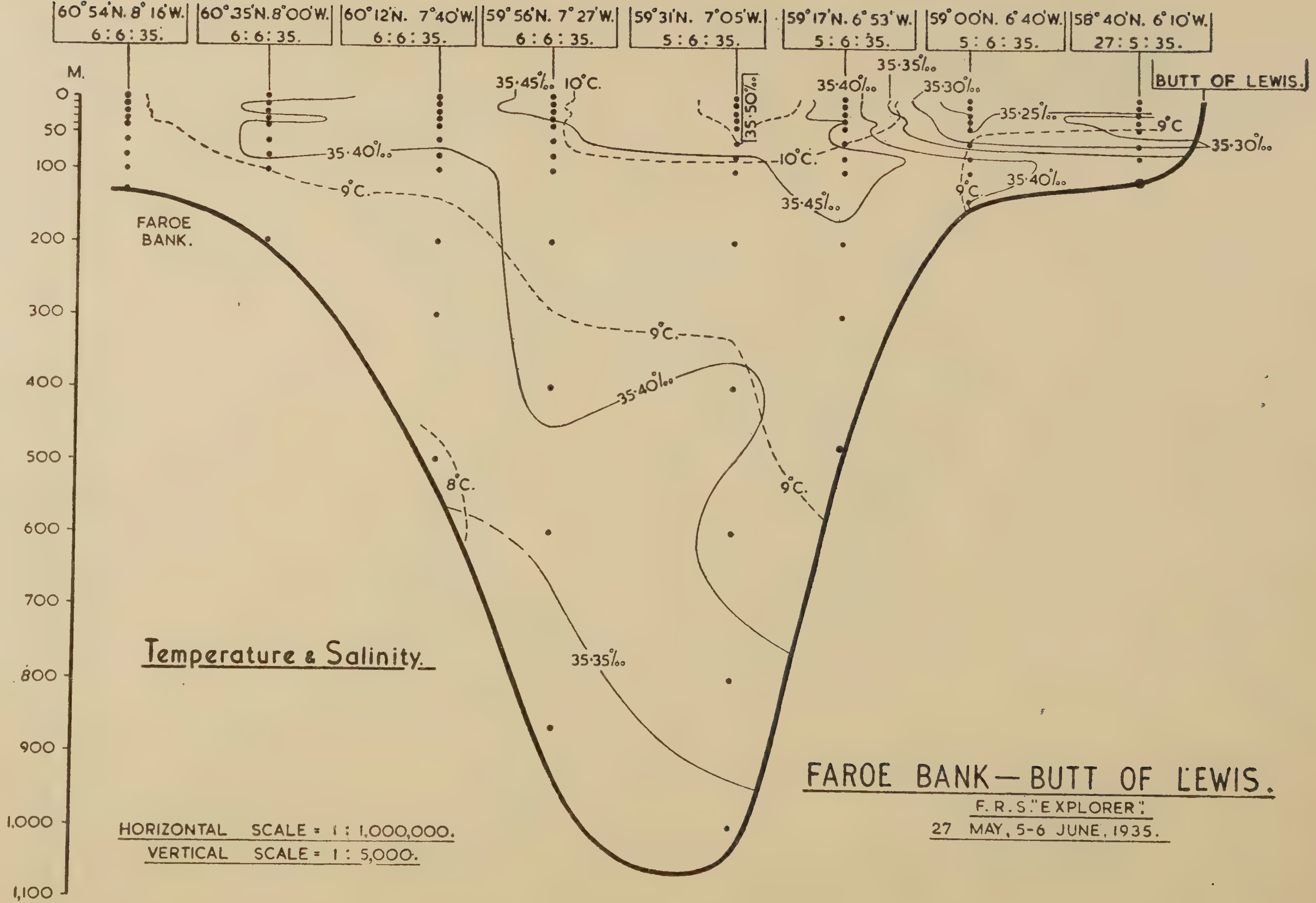

60° 54'N. 8° 16'W. 6 : 6 : 35.
60° 35'N. 8° 00'W. 6 : 6 : 35.
60° 12'N. 7° 40'W. 6 : 6 : 35.
59° 56'N. 7° 27'W. 6 : 6 : 35.
59° 31'N. 7° 05'W. 5 : 6 : 35.
59° 17'N. 6° 53'W. 5 : 6 : 35.
59° 00'N. 6° 40'W. 5 : 6 : 35.
58° 40'N. 6° 10'W. 27 : 5 : 35.
BUTT OF LEWIS.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
FAROE BANK.
35·40‰
9°C.
35·45‰
10°C.
35·50‰
35·40‰
35·35‰
35·30‰
35·25‰
9°C
35·30‰
35·45‰
9°C.
35·40‰
9°C.
35·40‰
9°C.
8°C.
35·35‰
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
FAROE BANK — BUTT OF LEWIS.
F.R.S. "EXPLORER".
27 MAY, 5-6 JUNE, 1935.

Fig. 20

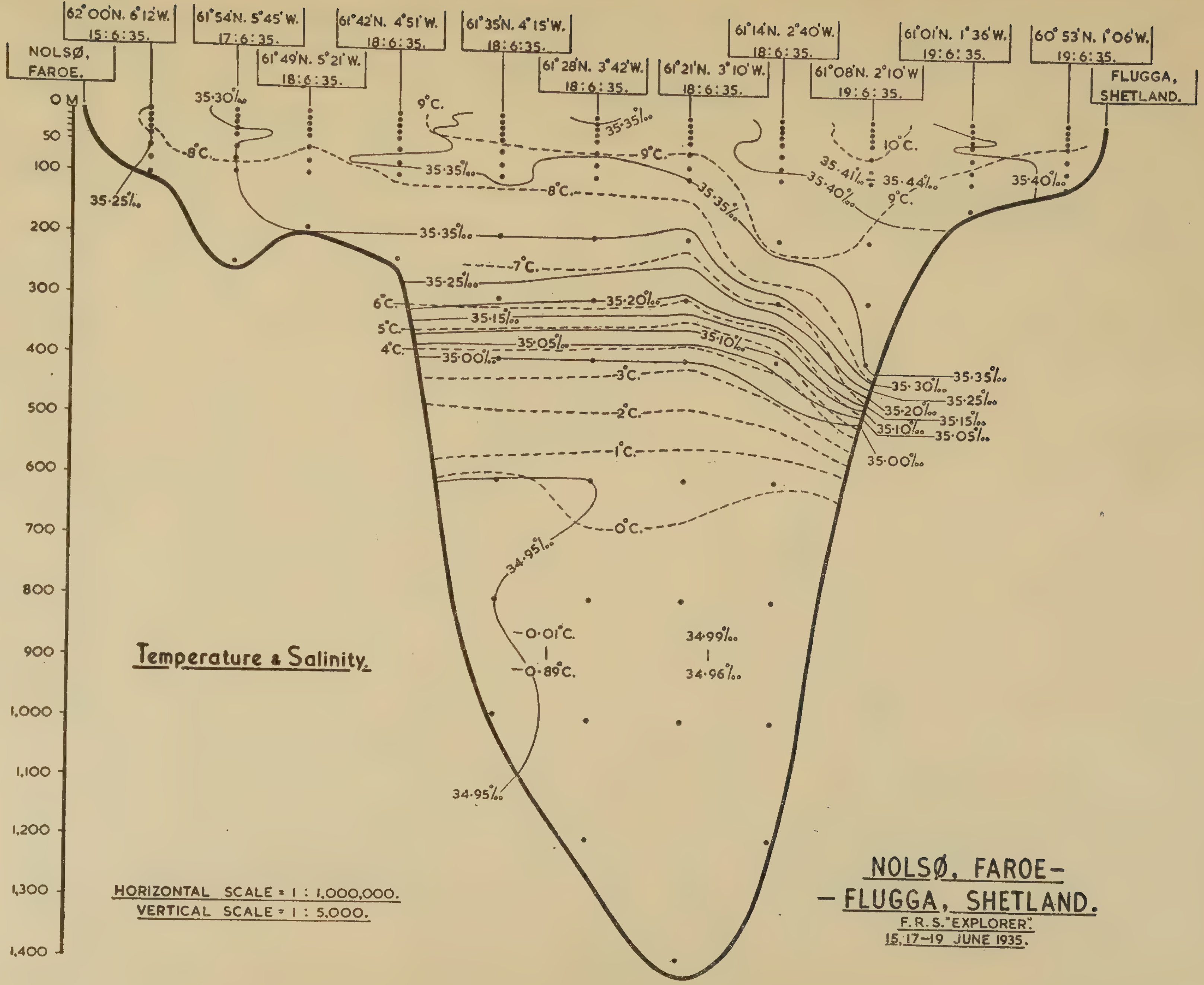

NOLSØ, FAROE.
62° 00'N. 6°12'W. 15:6:35.
61°54'N. 5°45'W. 17:6:35.
61°49'N. 5°21'W. 18:6:35.
61°42'N. 4°51'W. 18:6:35.
61°35'N. 4°15'W. 18:6:35.
61°28'N. 3°42'W. 18:6:35.
61°21'N. 3°10'W. 18:6:35.
61°14'N. 2°40'W. 18:6:35.
61°08'N. 2°10'W 19:6:35.
61°01'N. 1°36'W. 19:6:35.
60° 53'N. 1°06'W. 19:6:35.
FLUGGA, SHETLAND.
0 M
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
1,400
35·30‰
35·25‰
9°C.
8°C.
35·35‰
35·35‰
9°C.
10°C.
35·41‰ ÷ 35·44‰
35·40‰
9°C.
35·40‰
8°C.
35·35‰
35·35‰
7°C.
35·25‰
6°C.
35·20‰
35·15‰
5°C.
35·10‰
35·05‰
4°C.
35·00‰
3°C.
2°C.
1°C.
35·35‰
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
0°C.
34·95‰
−0·01°C.
−0·89°C.
34·99‰
34·96‰
34·95‰
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE–
– FLUGGA, SHETLAND.
F.R.S. "EXPLORER".
15, 17–19 JUNE 1935.

FIG. 21

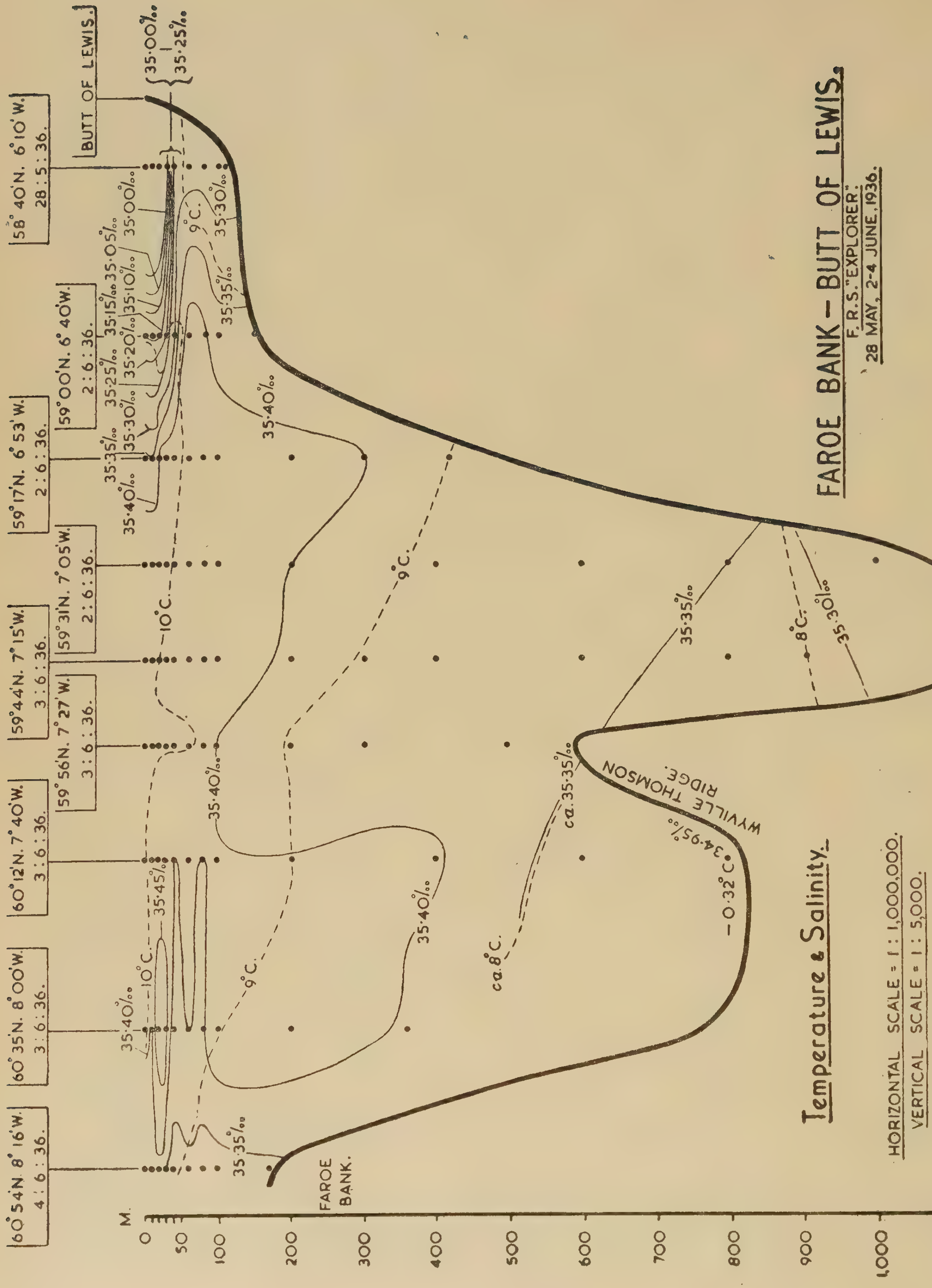

FAROE BANK — BUTT OF LEWIS.
F. R. S. "EXPLORER."
28 MAY, 2-4 JUNE, 1936.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
60°54'N. 8°16'W. 4 : 6 : 36.
60°35'N. 8°00'W. 3 : 6 : 36.
60°12'N. 7°40'W. 3 : 6 : 36.
59°56'N. 7°27'W. 3 : 6 : 36.
59°44'N. 7°15'W. 3 : 6 : 36.
59°31'N. 7°05'W. 2 : 6 : 36.
59°17'N. 6°53'W. 2 : 6 : 36.
59°00'N. 6°40'W. 2 : 6 : 36.
58°40'N. 6°10'W. 28 : 5 : 36.
BUTT OF LEWIS.
35·00‰ – 35·25‰
FAROE BANK.
WYVILLE THOMSON RIDGE.
35·35‰
35·40‰
35·45‰
10°C.
9°C.
ca. 8°C.
ca. 35·35‰
34·95‰
−0·32°C
8°C.
35·30‰
35·35‰
35·40‰
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200

FIG. 22

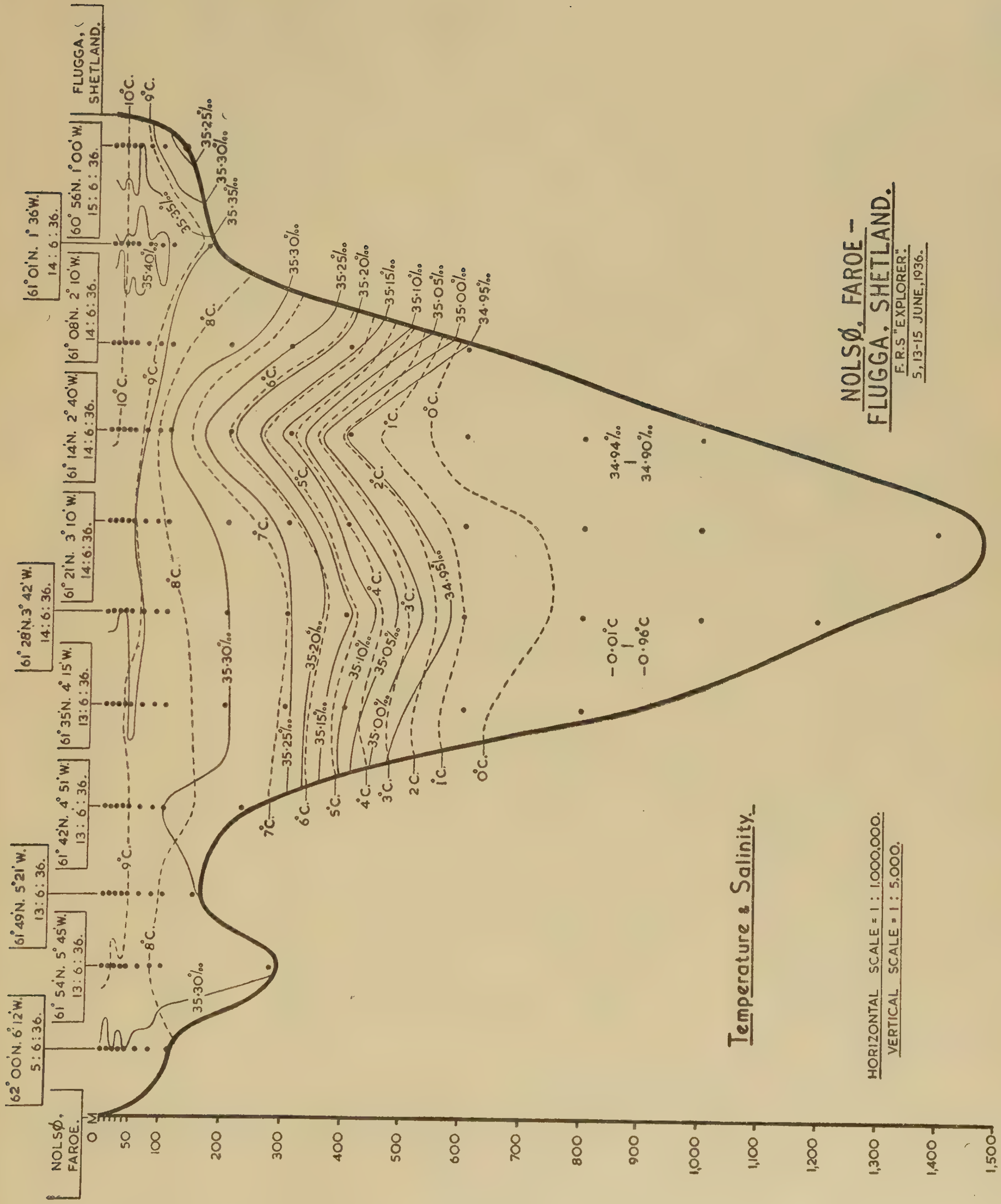

NOLSØ, FAROE.
FLUGGA, SHETLAND.
62° 00'N. 6° 12'W. 5 : 6 : 36.
61° 54'N. 5° 45'W. 13 : 6 : 36.
61° 49'N. 5° 21'W. 13 : 6 : 36.
61° 42'N. 4° 51'W. 13 : 6 : 36.
61° 35'N. 4° 15'W. 13 : 6 : 36.
61° 28'N. 3° 42'W. 14 : 6 : 36.
61° 21'N. 3° 10'W. 14 : 6 : 36.
61° 14'N. 2° 40'W. 14 : 6 : 36.
61° 08'N. 2° 10'W. 14 : 6 : 36.
61° 01'N. 1° 36'W. 14 : 6 : 36.
60° 56'N. 1° 00'W. 15 : 6 : 36.
M
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
1,400
1,500
10°C.
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
35·40‰
35·35‰
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·94‰
34·90‰
−0·01°C
−0·96°C
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE – FLUGGA, SHETLAND.
F.R.S "EXPLORER."
5, 13-15 JUNE, 1936.

FIG. 23

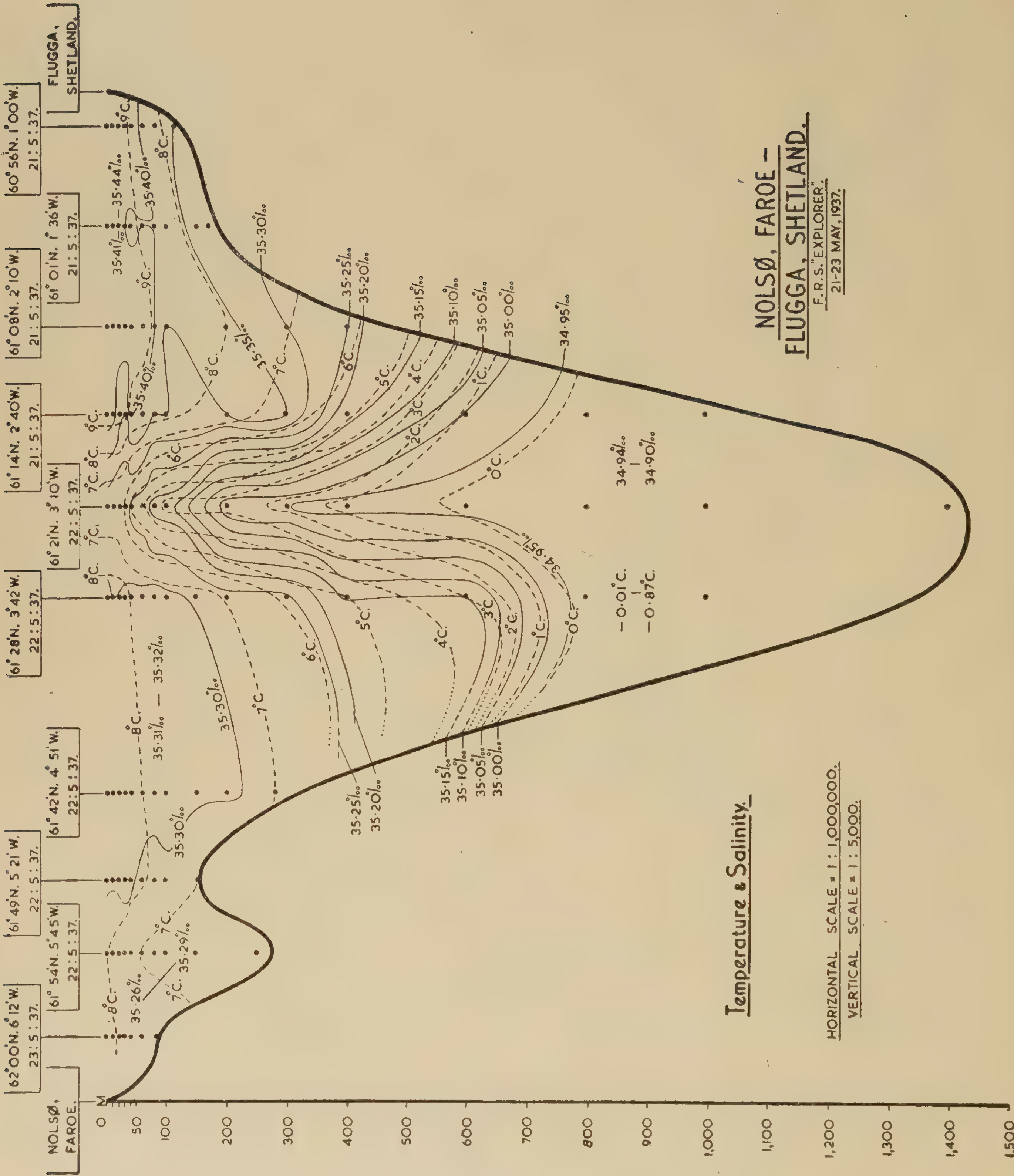

NOLSØ, FAROE – FLUGGA, SHETLAND.
F.R.S. "EXPLORER."
21-23 MAY, 1937.
Temperature & Salinity.
HORIZONTAL SCALE = 1:1,000,000.
VERTICAL SCALE = 1:5,000.
NOLSØ, FAROE.
62° 00'N. 6° 12'W. 23:5:37.
61° 54'N. 5° 45'W. 22:5:37.
61° 49'N. 5° 21'W. 22:5:37.
61° 42'N. 4° 51'W. 22:5:37.
61° 28'N. 3° 42'W. 22:5:37.
61° 21'N. 3° 10'W. 22:5:37.
61° 14'N. 2° 40'W. 21:5:37.
61° 08'N. 2° 10'W. 21:5:37.
61° 01'N. 1° 36'W. 21:5:37.
60° 56'N. 1° 00'W. 21:5:37.
FLUGGA, SHETLAND.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
1,400
1,500
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
9°C.
35·26‰
35·29‰
35·31‰ — 35·32‰
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
35·35‰
35·40‰
35·41‰ — 35·44‰
−0·01°C. – −0·87°C.
34·94‰ – 34·90‰

Fig. 24

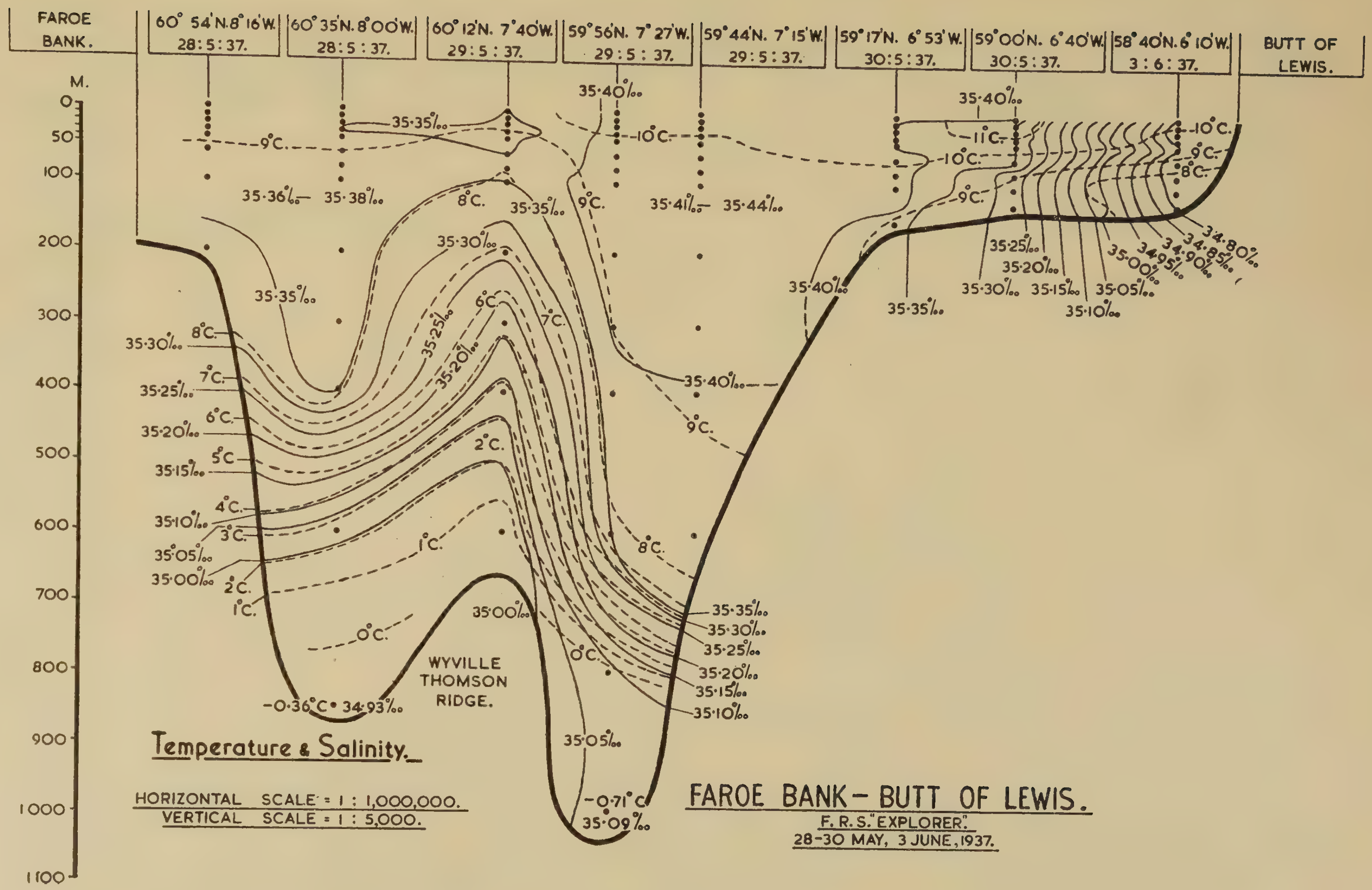

FAROE BANK.
60° 54'N. 8° 16'W. 28:5:37.
60° 35'N. 8° 00'W. 28:5:37.
60° 12'N. 7° 40'W. 29:5:37.
59° 56'N. 7° 27'W. 29:5:37.
59° 44'N. 7° 15'W. 29:5:37.
59° 17'N. 6° 53'W. 30:5:37.
59° 00'N. 6° 40'W. 30:5:37.
58° 40'N. 6° 10'W. 3:6:37.
BUTT OF LEWIS.
M.
0
50
100
200
300
400
500
600
700
800
900
1000
1100
9°C.
10°C.
11°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
35·35‰
35·36‰
35·38‰
35·40‰
35·41‰
35·44‰
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·90‰
34·85‰
34·80‰
-0·36°C· 34·93‰
-0·71°C 35·09‰
WYVILLE THOMSON RIDGE.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
FAROE BANK – BUTT OF LEWIS.
F. R. S. "EXPLORER".
28–30 MAY, 3 JUNE, 1937.

Fig. 25

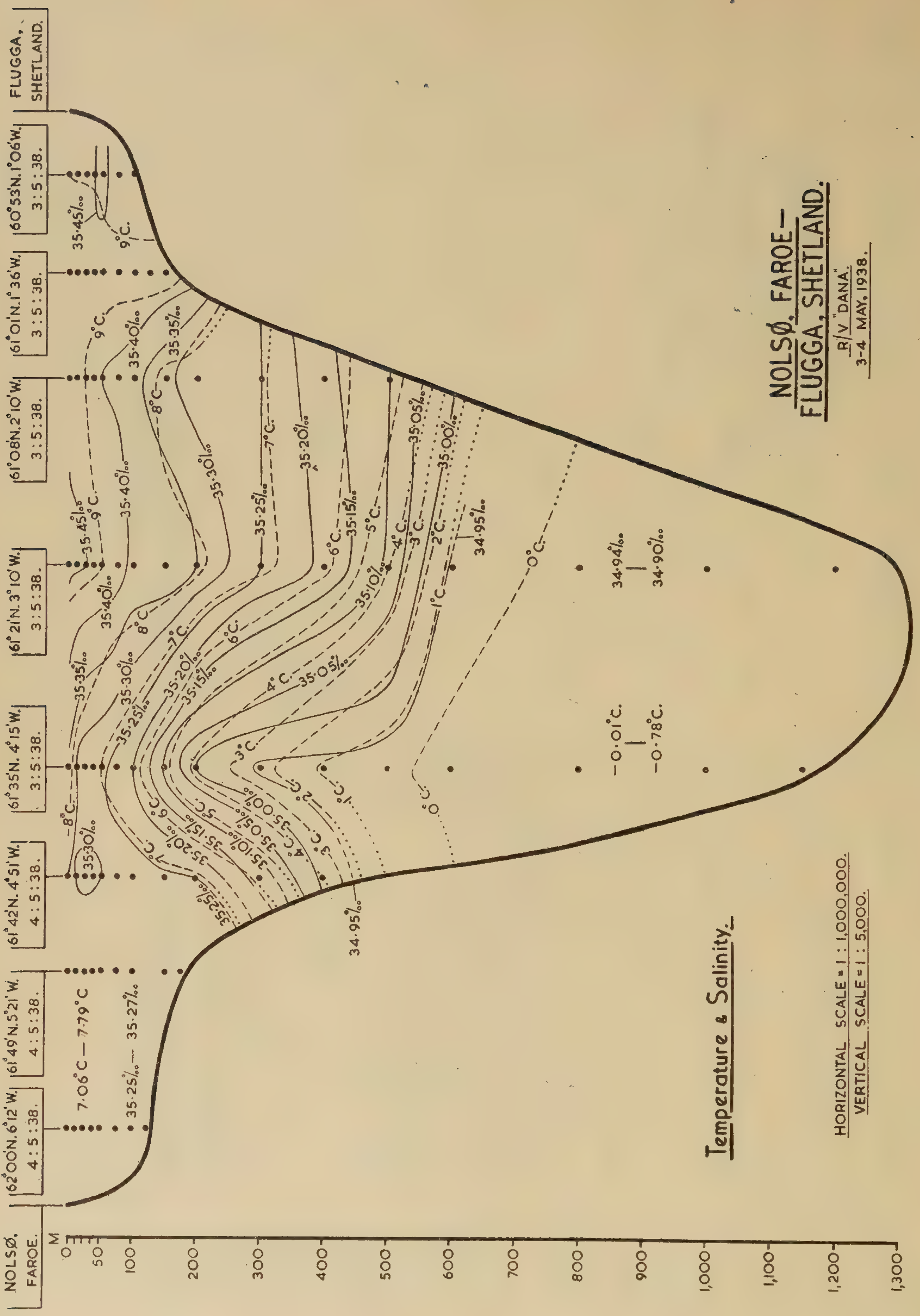

NOLSØ, FAROE—FLUGGA, SHETLAND.
R/V "DANA."
3-4 MAY, 1938.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ. FAROE.
FLUGGA, SHETLAND.
62°00'N. 6°12'W. 4 : 5 : 38.
61°49'N. 5°21'W. 4 : 5 : 38.
61°42'N. 4°51'W. 4 : 5 : 38.
61°35'N. 4°15'W. 3 : 5 : 38.
61°21'N. 3°10'W. 3 : 5 : 38.
61°08'N. 2°10'W. 3 : 5 : 38.
61°01'N. 1°36'W. 3 : 5 : 38.
60°53'N. 1°06'W. 3 : 5 : 38.
7·06°C — 7·79°C
35·25‰ — 35·27‰
−0·01°C.
−0·78°C.
34·94‰
34·90‰
34·95‰
0°C.
1°C.
2°C.
3°C.
4°C.
5°C.
6°C.
7°C.
8°C.
9°C.
35·00‰
35·05‰
35·10‰
35·15‰
35·20‰
35·25‰
35·30‰
35·35‰
35·40‰
35·45‰
M
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300

Fig. 26

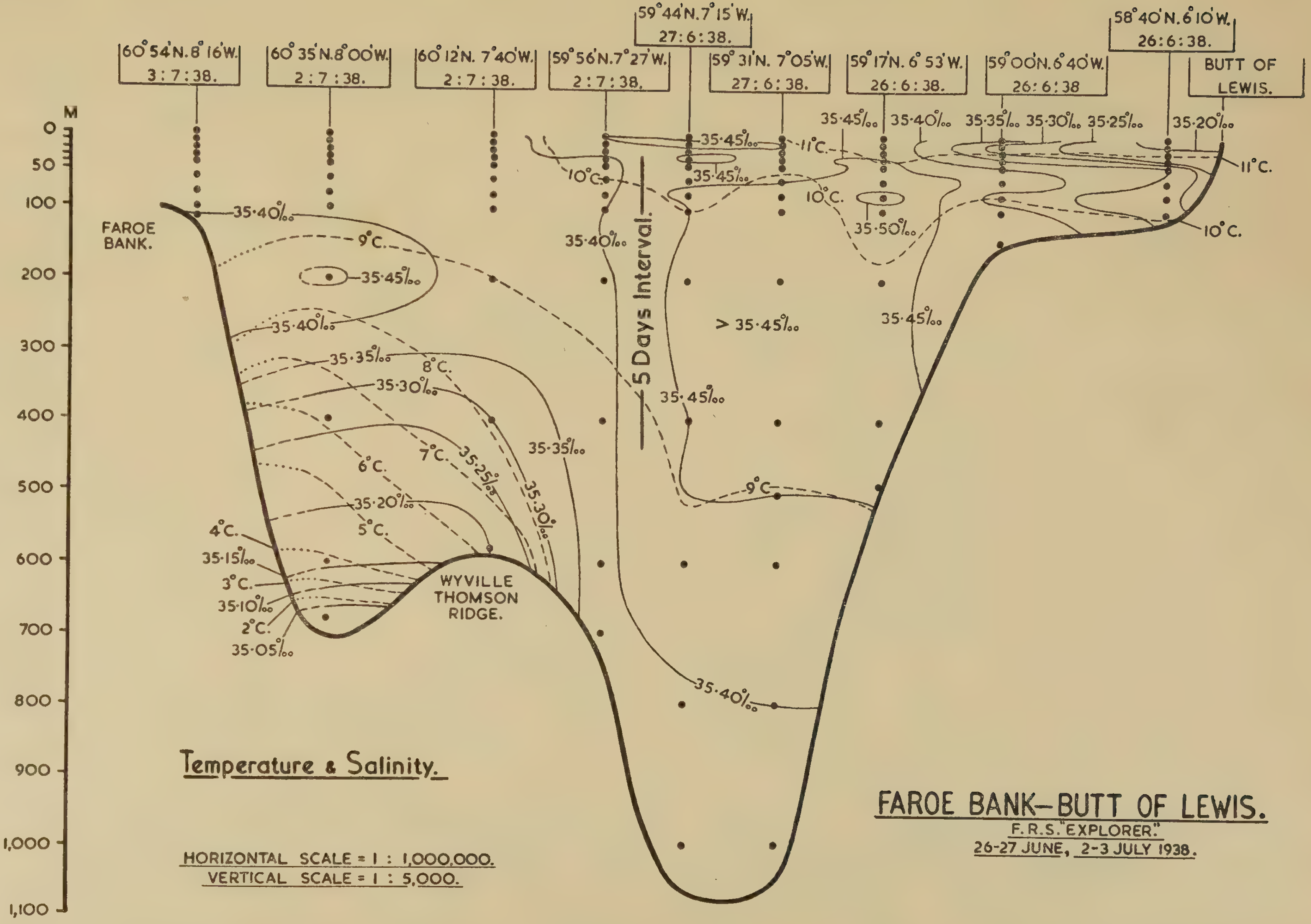

FAROE BANK—BUTT OF LEWIS.
F.R.S. "EXPLORER."
26-27 JUNE, 2-3 JULY 1938.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
60° 54′ N. 8° 16′ W. 3 : 7 : 38.
60° 35′ N. 8° 00′ W. 2 : 7 : 38.
60° 12′ N. 7° 40′ W. 2 : 7 : 38.
59° 56′ N. 7° 27′ W. 2 : 7 : 38.
59° 44′ N. 7° 15′ W. 27 : 6 : 38.
59° 31′ N. 7° 05′ W. 27 : 6 : 38.
59° 17′ N. 6° 53′ W. 26 : 6 : 38.
59° 00′ N. 6° 40′ W. 26 : 6 : 38
58° 40′ N. 6° 10′ W. 26 : 6 : 38.
BUTT OF LEWIS.
FAROE BANK.
WYVILLE THOMSON RIDGE.
5 Days Interval.
M
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
35·40‰
9°C.
35·45‰
35·40‰
35·35‰
8°C.
35·30‰
7°C.
35·25‰
6°C.
35·20‰
5°C.
35·35‰
35·30‰
4°C.
35·15‰
3°C.
35·10‰
2°C.
35·05‰
10°C.
35·40‰
35·45‰
35·45‰
> 35·45‰
35·45‰
9°C.
35·40‰
11°C.
10°C.
35·50‰
35·45‰
35·45‰
35·40‰
35·35‰
35·30‰
35·25‰
35·20‰
11°C.
10°C.

FIG. 27

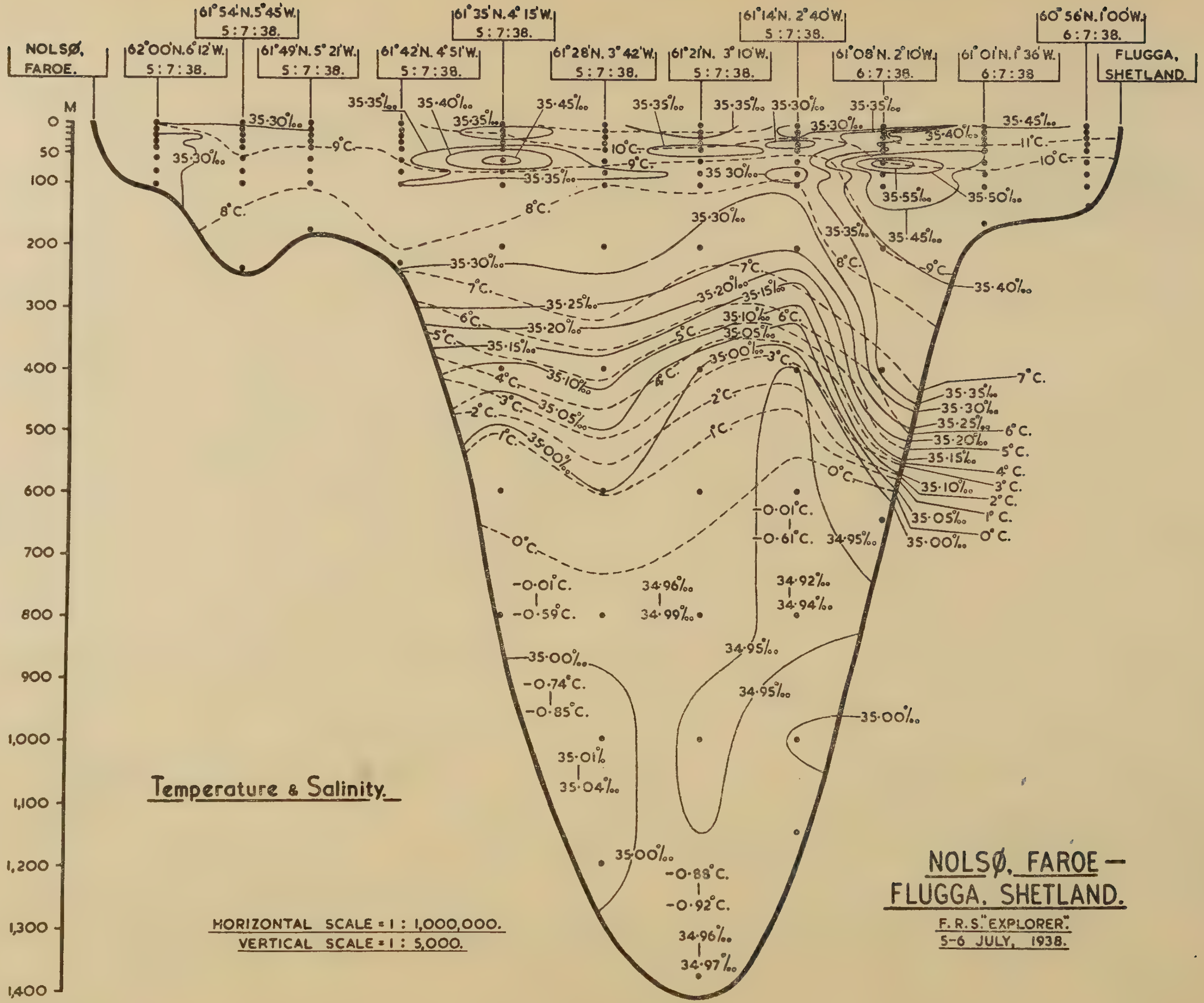

NOLSØ, FAROE.
62°00'N. 6°12'W. 5:7:38.
61°54'N. 5°45'W. 5:7:38.
61°49'N. 5°21'W. 5:7:38.
61°42'N. 4°51'W. 5:7:38.
61°35'N. 4°15'W. 5:7:38.
61°28'N. 3°42'W. 5:7:38.
61°21'N. 3°10'W. 5:7:38.
61°14'N. 2°40'W. 5:7:38.
61°08'N. 2°10'W. 6:7:38.
61°01'N. 1°36'W. 6:7:38
60°56'N. 1°00'W. 6:7:38.
FLUGGA, SHETLAND.
M
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
1,400
35·30‰
35·35‰
35·40‰
35·45‰
35·50‰
35·55‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
11°C.
10°C.
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
-0·01°C.
-0·61°C.
34·92‰
34·94‰
-0·01°C.
-0·59°C.
34·96‰
34·99‰
-0·74°C.
-0·85°C.
35·01‰
35·04‰
-0·88°C.
-0·92°C.
34·96‰
34·97‰
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE — FLUGGA, SHETLAND.
F. R. S. "EXPLORER."
5–6 JULY, 1938.

Fig. 28

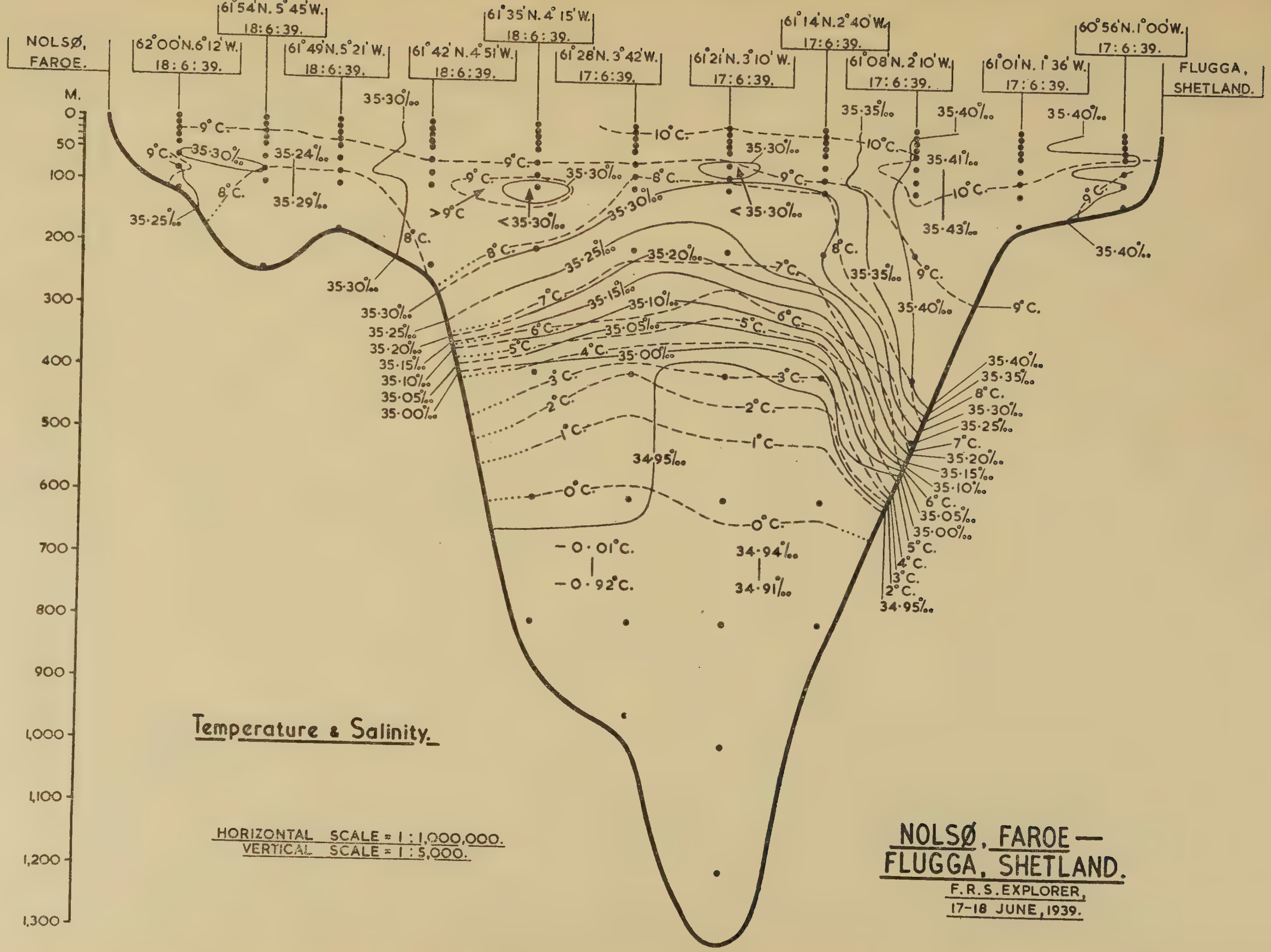
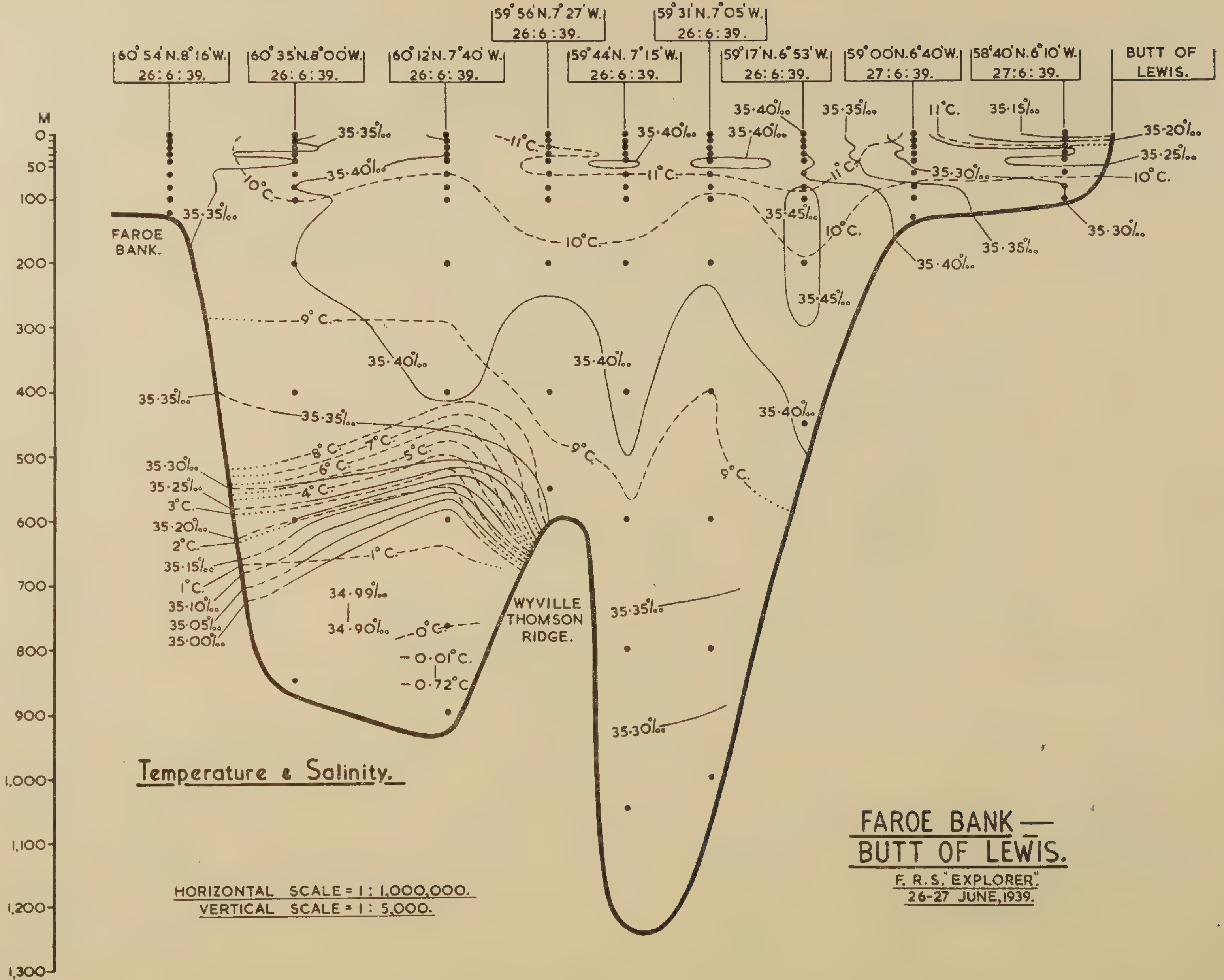

NOLSØ, FAROE
62°00'N. 6°12'W. 18:6:39.
61°54'N. 5°45'W. 18:6:39.
61°49'N. 5°21'W. 18:6:39.
61°42'N. 4°51'W. 18:6:39.
61°35'N. 4°15'W. 18:6:39.
61°28'N. 3°42'W. 17:6:39.
61°21'N. 3°10'W. 17:6:39.
61°14'N. 2°40'W. 17:6:39.
61°08'N. 2°10'W. 17:6:39.
61°01'N. 1°36'W. 17:6:39.
60°56'N. 1°00'W. 17:6:39.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
9°C.
35·30‰
35·24‰
35·29‰
8°C.
35·25‰
10°C.
>9°C
<35·30‰
35·41‰
35·43‰
35·40‰
35·35‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
34·95‰
−0·01°C.
−0·92°C.
34·94‰
34·91‰
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE — FLUGGA, SHETLAND.
F.R.S. EXPLORER,
17–18 JUNE, 1939.

FIG. 29



60° 54′ N. 8° 16′ W. 26:6:39.
60° 35′ N. 8° 00′ W. 26:6:39.
60° 12′ N. 7° 40′ W. 26:6:39.
59° 56′ N. 7° 27′ W. 26:6:39.
59° 44′ N. 7° 15′ W. 26:6:39.
59° 31′ N. 7° 05′ W. 26:6:39.
59° 17′ N. 6° 53′ W. 26:6:39.
59° 00′ N. 6° 40′ W. 27:6:39.
58° 40′ N. 6° 10′ W. 27:6:39.
BUTT OF LEWIS.
FAROE BANK.
WYVILLE THOMSON RIDGE.
M
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
35·35‰
35·40‰
35·45‰
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·99‰
34·90‰
11° C.
10° C.
9° C.
8° C.
7° C.
6° C.
5° C.
4° C.
3° C.
2° C.
1° C.
0° C.
−0·01° C.
−0·72° C.
Temperature & Salinity.
FAROE BANK — BUTT OF LEWIS.
F. R. S. "EXPLORER."
26-27 JUNE, 1939.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.

Fig. 30

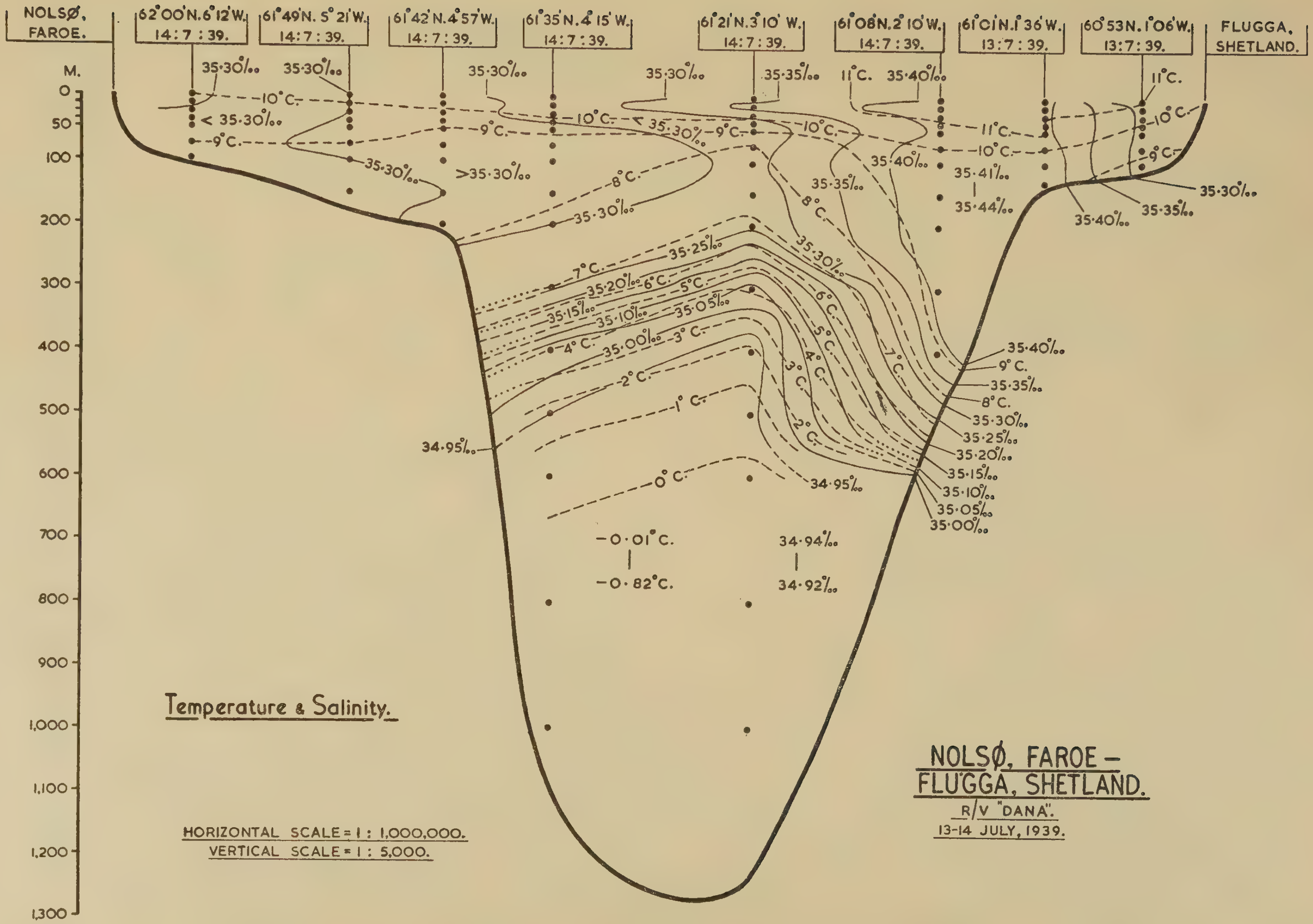
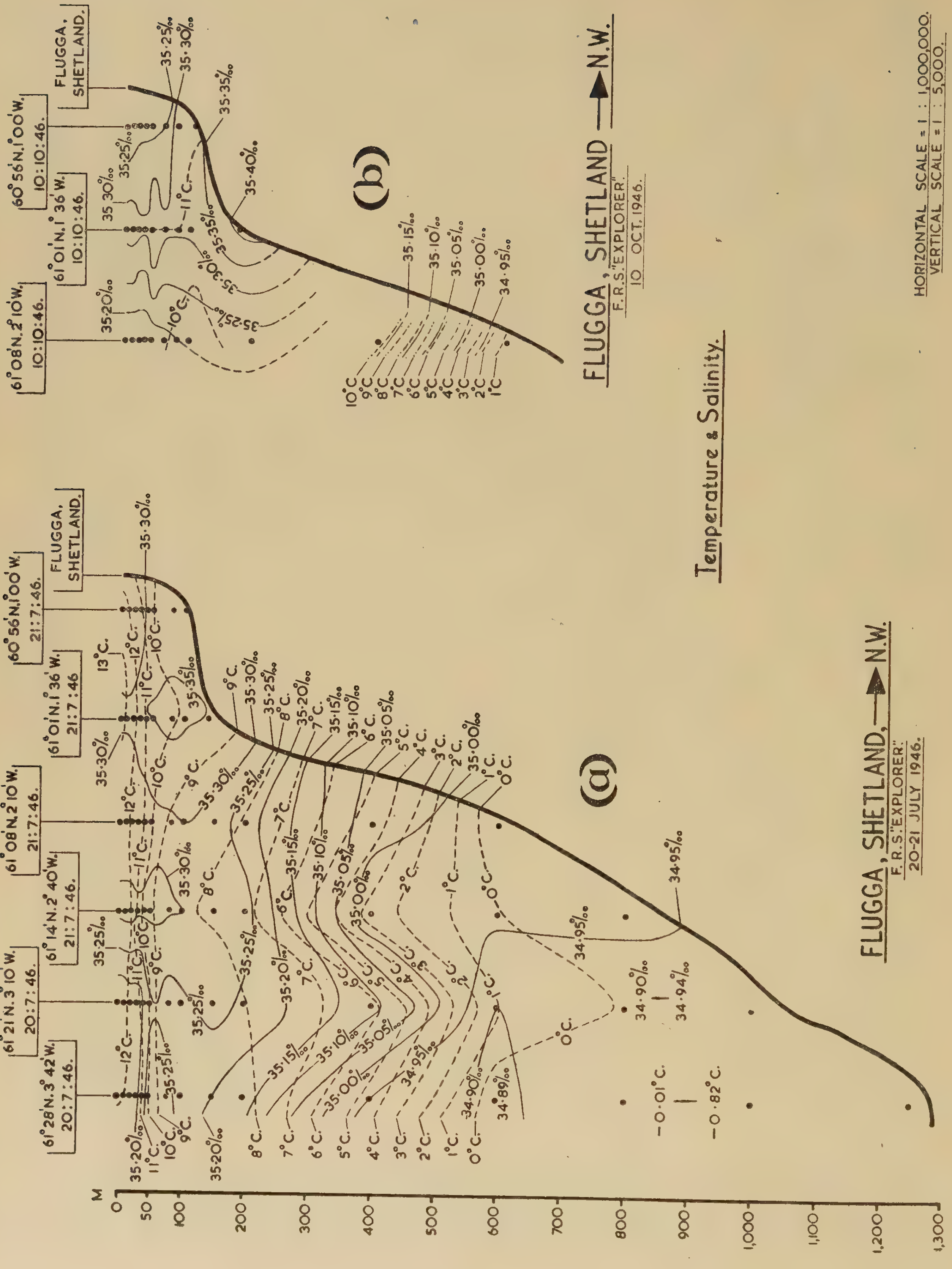

NOLSØ, FAROE.
62°00'N. 6°12'W. 14:7:39.
61°49'N. 5°21'W. 14:7:39.
61°42'N. 4°57'W. 14:7:39.
61°35'N. 4°15'W. 14:7:39.
61°21'N. 3°10'W. 14:7:39.
61°08'N. 2°10'W. 14:7:39.
61°01'N. 1°36'W. 13:7:39.
60°53'N. 1°06'W. 13:7:39.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
35·30‰
10°C.
< 35·30‰
9°C.
>35·30‰
8°C.
11°C.
35·35‰
35·40‰
35·41‰
35·44‰
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
−0·01°C.
−0·82°C.
34·94‰
34·92‰
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE — FLUGGA, SHETLAND.
R/V "DANA".
13-14 JULY, 1939.

FIG. 31



(a)
FLUGGA, SHETLAND, → N.W.
F.R.S. "EXPLORER"
20-21 JULY 1946.
(b)
FLUGGA, SHETLAND → N.W.
F.R.S. "EXPLORER"
10 OCT. 1946.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
FLUGGA, SHETLAND.
60°56'N. 1°00'W. 21:7:46.
61°01'N. 1°36'W. 21:7:46
61°08'N. 2°10'W. 21:7:46.
61°14'N. 2°40'W. 21:7:46.
61°21'N. 3°10'W. 20:7:46.
61°28'N. 3°42'W. 20:7:46.
60°56'N. 1°00'W. 10:10:46.
61°01'N. 1°36'W. 10:10:46.
61°08'N. 2°10'W. 10:10:46.
M
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
−0·01°C.
−0·82°C.
34·90‰
34·94‰
34·95‰
34·89‰
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
35·35‰
35·40‰
13°C.
12°C.
11°C.
10°C.
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.

FIG. 32

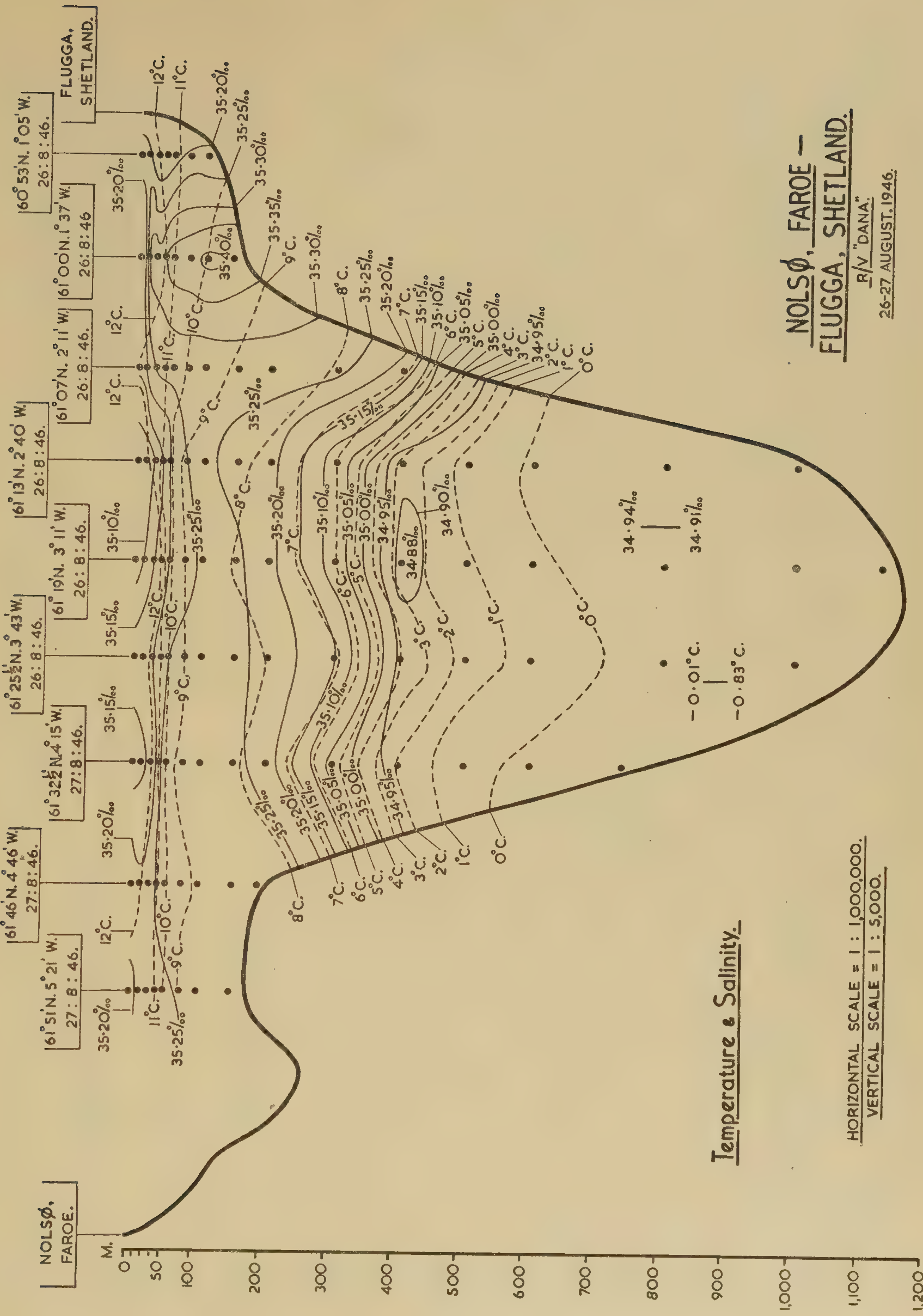

NOLSØ, FAROE — FLUGGA, SHETLAND.
R/V "DANA."
26-27 AUGUST. 1946.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE.
FLUGGA, SHETLAND.
61° 51'N. 5° 21' W. 27: 8: 46.
61° 46'N. 4° 46' W. 27: 8: 46.
61° 32½'N. 4° 15' W. 27: 8: 46.
61° 25½'N. 3° 43' W. 26: 8: 46.
61° 19'N. 3° 11' W. 26: 8: 46.
61° 13'N. 2° 40' W. 26: 8: 46.
61° 07'N. 2° 11' W. 26: 8: 46.
61° 00'N. 1° 37' W. 26: 8: 46
60° 53'N. 1° 05' W. 26: 8: 46.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
12°C.
11°C.
10°C.
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
35·40‰
35·35‰
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·90‰
34·88‰
34·94‰
34·91‰
−0·01°C.
−0·83°C.

FIG. 33

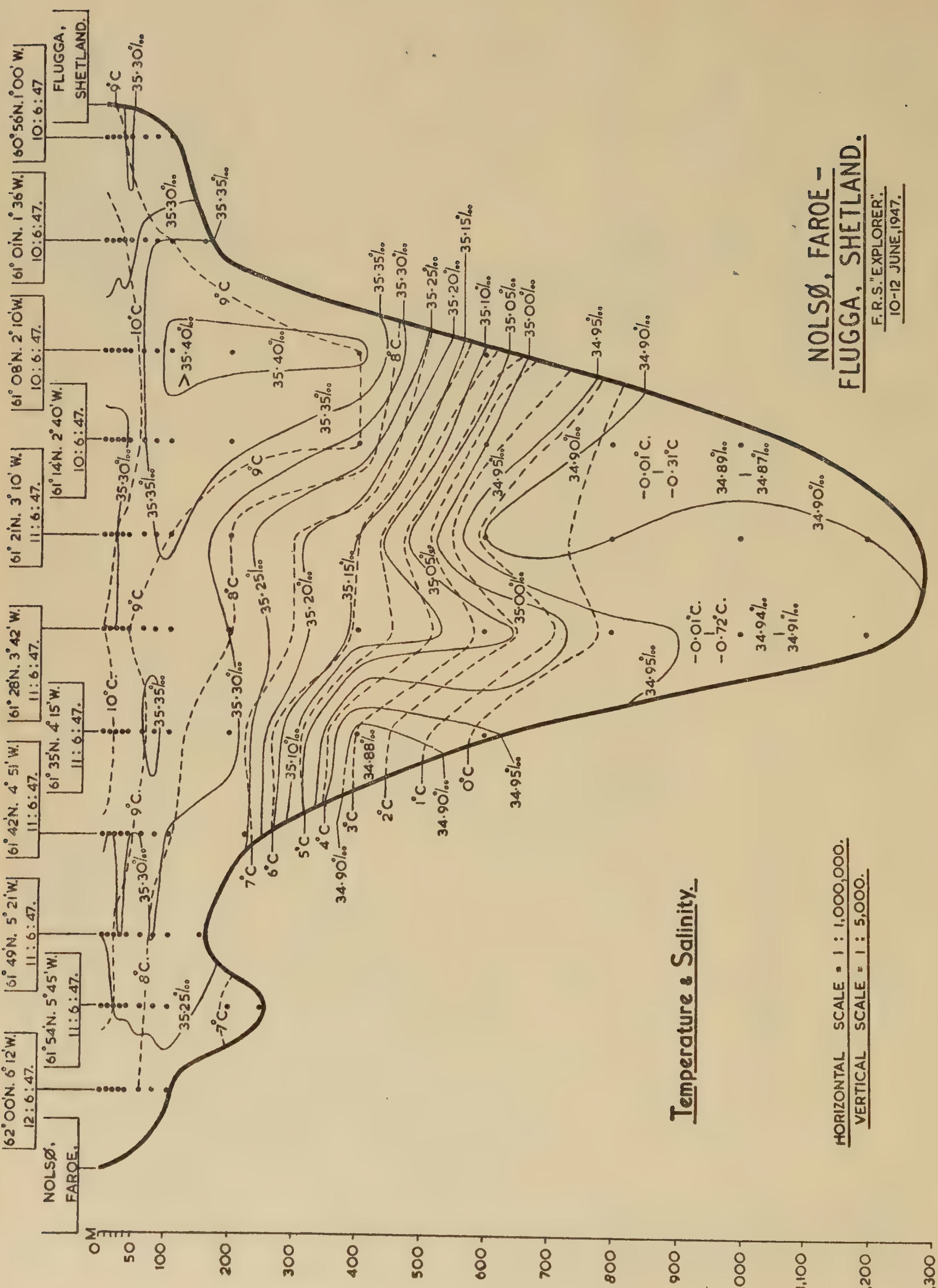

NOLSØ, FAROE — FLUGGA, SHETLAND.
F.R.S. "EXPLORER".
10-12 JUNE, 1947.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE.
62° 00N. 6° 12'W. 12 : 6 : 47.
61° 54'N. 5° 45'W. 11 : 6 : 47.
61° 49N. 5° 21'W. 11 : 6 : 47.
61° 42'N. 4° 51'W. 11 : 6 : 47.
61° 35'N. 4° 15'W. 11 : 6 : 47.
61° 28'N. 3° 42'W. 11 : 6 : 47.
61° 21N. 3° 10'W. 11 : 6 : 47.
61° 14'N. 2° 40'W. 10 : 6 : 47.
61° 08'N. 2° 10'W. 10 : 6 : 47.
61° 01N. 1° 36'W. 10 : 6 : 47.
60° 56'N. 1° 00'W. 10 : 6 : 47
FLUGGA, SHETLAND.
0 M
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
10°C
9°C
8°C
7°C
6°C
5°C
4°C
3°C
2°C
1°C
0°C
>35·40‰
35·40‰
35·35‰
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·90‰
34·88‰
−0·01°C. − −0·31°C
34·89‰ − 34·87‰
−0·01°C. − −0·72°C.
34·94‰ − 34·91‰

FIG. 34

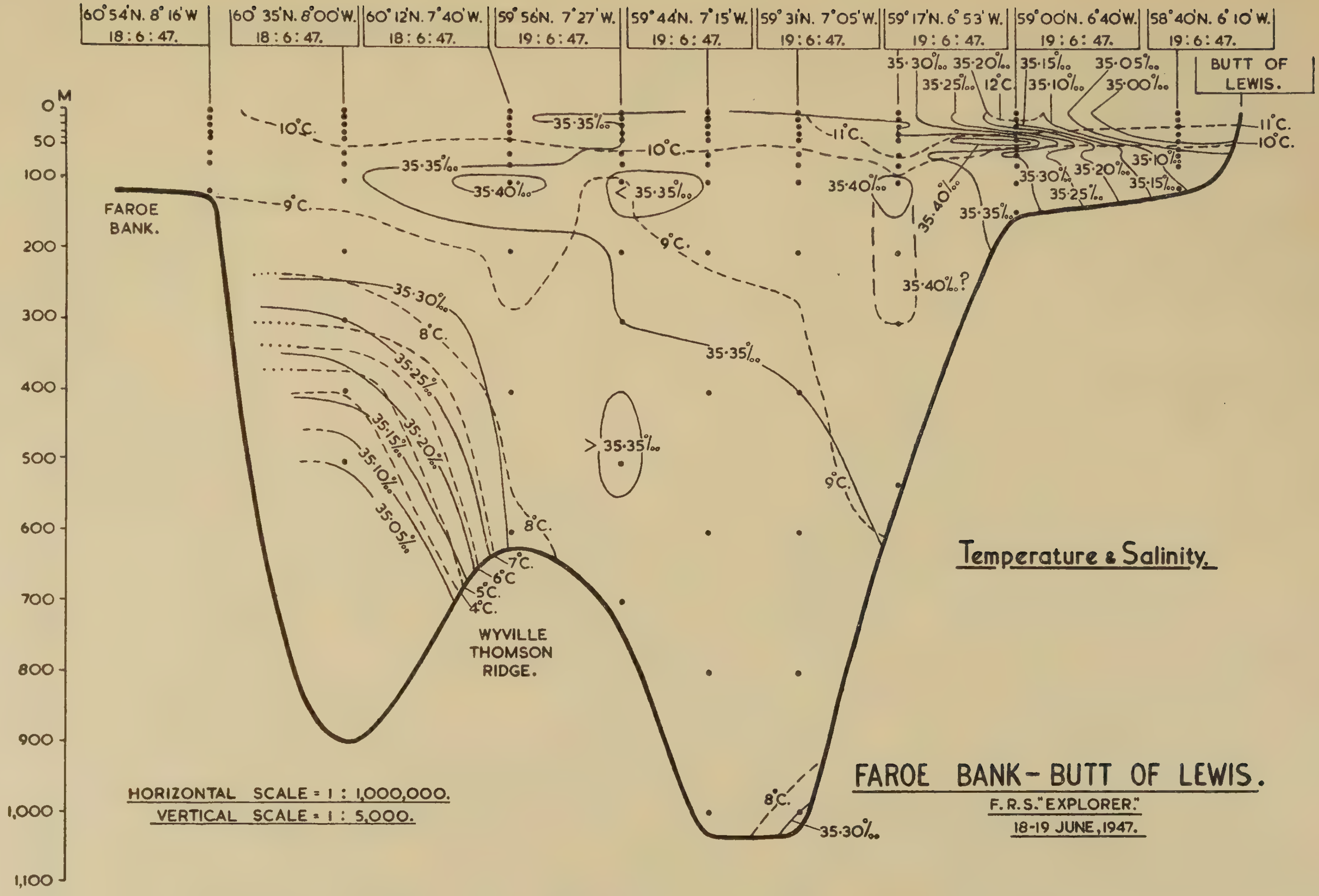

60°54'N. 8°16'W 18:6:47.
60°35'N. 8°00'W. 18:6:47.
60°12'N. 7°40'W. 18:6:47.
59°56'N. 7°27'W. 19:6:47.
59°44'N. 7°15'W. 19:6:47.
59°31'N. 7°05'W. 19:6:47.
59°17'N. 6°53'W. 19:6:47.
59°00'N. 6°40'W. 19:6:47.
58°40'N. 6°10'W. 19:6:47.
BUTT OF LEWIS.
M
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
FAROE BANK.
WYVILLE THOMSON RIDGE.
10°C.
9°C.
11°C.
8°C.
7°C.
6°C
5°C.
4°C.
12°C
35·00‰
35·05‰
35·10‰
35·15‰
35·20‰
35·25‰
35·30‰
35·35‰
35·40‰
< 35·35‰
> 35·35‰
35·40‰?
Temperature & Salinity.
FAROE BANK – BUTT OF LEWIS.
F.R.S. "EXPLORER."
18-19 JUNE, 1947.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.

FIG. 35

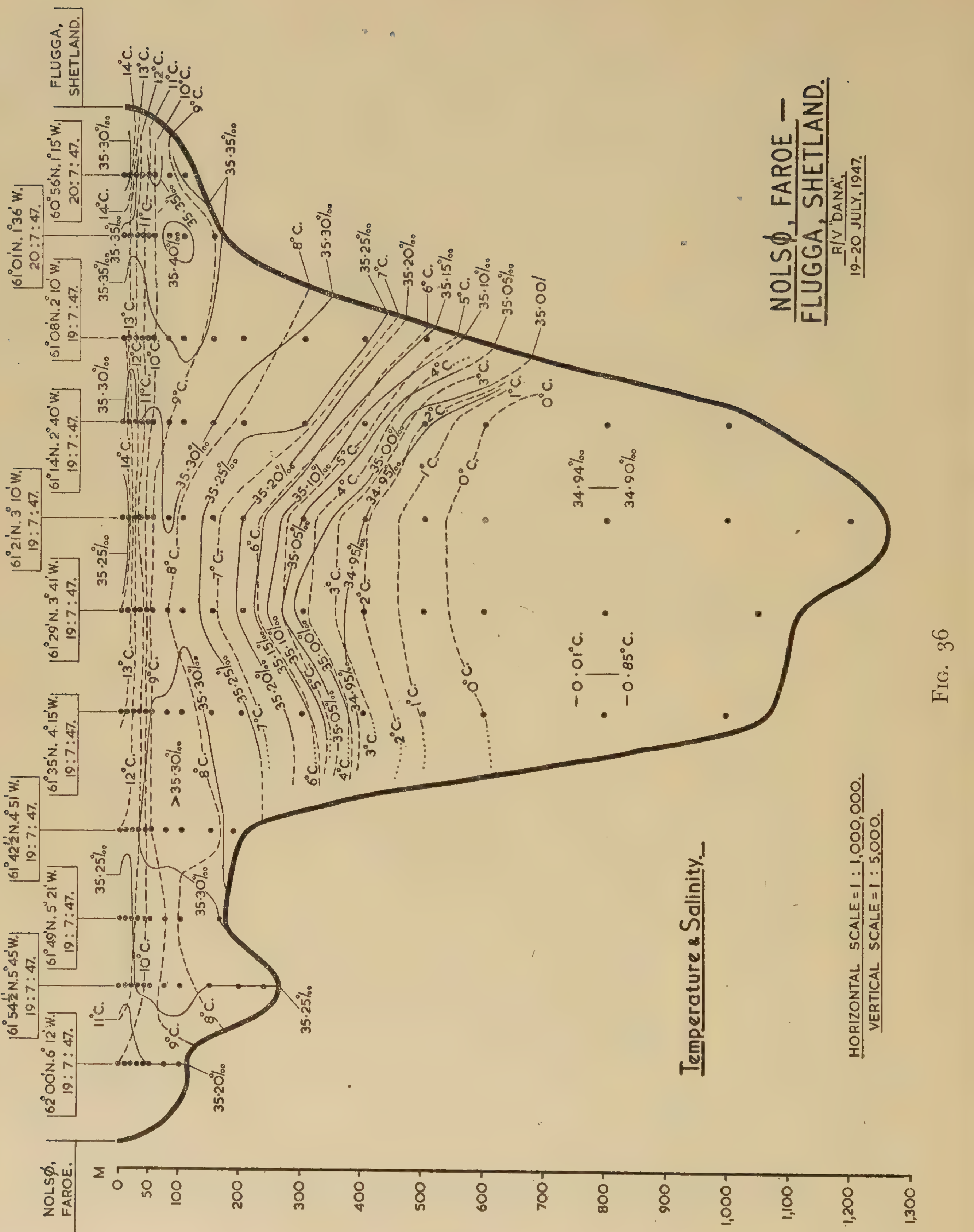

NOLSØ, FAROE — FLUGGA, SHETLAND.
R/V "DANA".
19–20 JULY, 1947.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE.
FLUGGA, SHETLAND.
62°00'N. 6°12'W. 19 : 7 : 47.
61°54½'N. 5°45'W. 19 : 7 : 47.
61°49'N. 5°21'W. 19 : 7 : 47.
61°42½'N. 4°51'W. 19 : 7 : 47.
61°35'N. 4°15'W. 19 : 7 : 47.
61°29'N. 3°41'W. 19 : 7 : 47.
61°21'N. 3°10'W. 19 : 7 : 47.
61°14'N. 2°40'W. 19 : 7 : 47.
61°08'N. 2°10'W. 19 : 7 : 47.
61°01'N. 1°36'W. 20 : 7 : 47.
60°56'N. 1°15'W. 20 : 7 : 47.
M
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
14°C.
13°C.
12°C.
11°C.
10°C.
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
35·40‰
35·35‰
35·30‰
>35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·94‰
34·90‰
−0·01°C.
−0·85°C.

Fig. 36

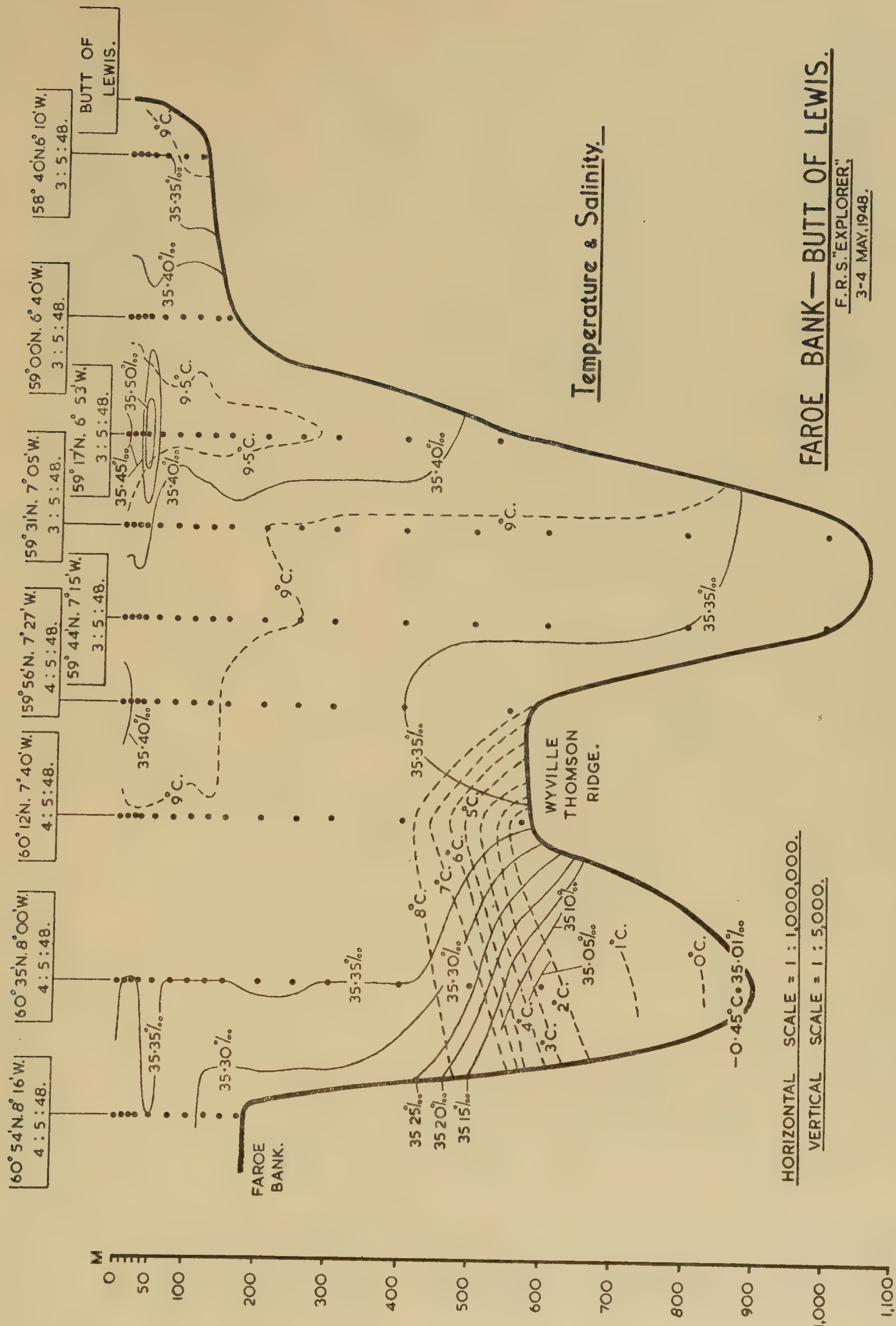

FAROE BANK—BUTT OF LEWIS.
F.R.S. "EXPLORER."
3-4 MAY. 1948.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
60° 54'N. 8° 16'W. 4 : 5 : 48.
60° 35'N. 8° 00'W. 4 : 5 : 48.
60° 12'N. 7° 40'W. 4 : 5 : 48.
59° 56'N. 7° 27'W. 4 : 5 : 48.
59° 44'N. 7° 15'W. 3 : 5 : 48.
59° 31'N. 7° 05'W. 3 : 5 : 48.
59° 17'N. 6° 53'W. 3 : 5 : 48.
59° 00'N. 6° 40'W. 3 : 5 : 48.
58° 40'N. 6° 10'W. 3 : 5 : 48.
BUTT OF LEWIS.
FAROE BANK.
WYVILLE THOMSON RIDGE.
35·35‰
35·30‰
35·35‰
35·40‰
9°C.
9°C.
9°C.
9°C.
9·5°C.
9·5°C.
35·45‰
35·50‰
35·40‰
35·40‰
35·40‰
35·35‰
35·35‰
35·35‰
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
−0·45°C.
35·01‰
M
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100

FIG. 37

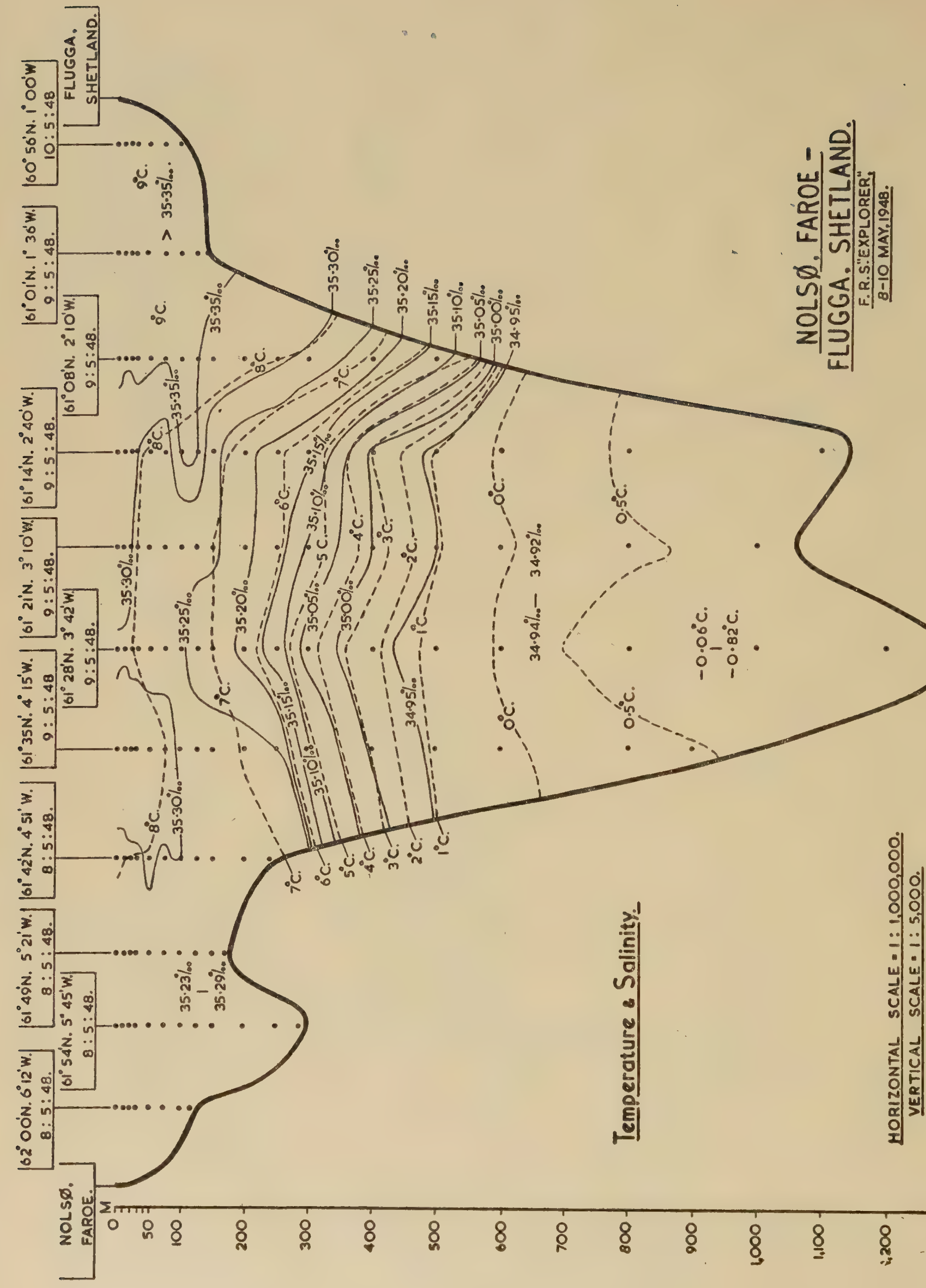

NOLSØ, FAROE – FLUGGA, SHETLAND.
F. R. S. "EXPLORER"
8-10 MAY, 1948.
Temperature & Salinity.
HORIZONTAL SCALE - 1 : 1,000,000.
VERTICAL SCALE - 1 : 5,000.
NOLSØ, FAROE.
62° 00'N. 6° 12'W. 8 : 5 : 48.
61° 54'N. 5° 45'W. 8 : 5 : 48.
61° 49'N. 5° 21'W. 8 : 5 : 48.
61° 42'N. 4° 51'W. 8 : 5 : 48.
61° 35'N. 4° 15'W. 9 : 5 : 48
61° 28'N. 3° 42'W. 9 : 5 : 48.
61° 21'N. 3° 10'W. 9 : 5 : 48.
61° 14'N. 2° 40'W. 9 : 5 : 48.
61° 08'N. 2° 10'W. 9 : 5 : 48.
61° 01'N. 1° 36'W. 9 : 5 : 48.
60° 56'N. 1° 00'W. 10 : 5 : 48
FLUGGA, SHETLAND.
M
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
35·23‰ – 35·29‰
8°C.
35·30‰
35·35‰
35·25‰
35·30‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·94‰
34·92‰
9°C.
> 35·35‰
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
0·5°C.
–0·06°C. – –0·82°C.

Fig. 38

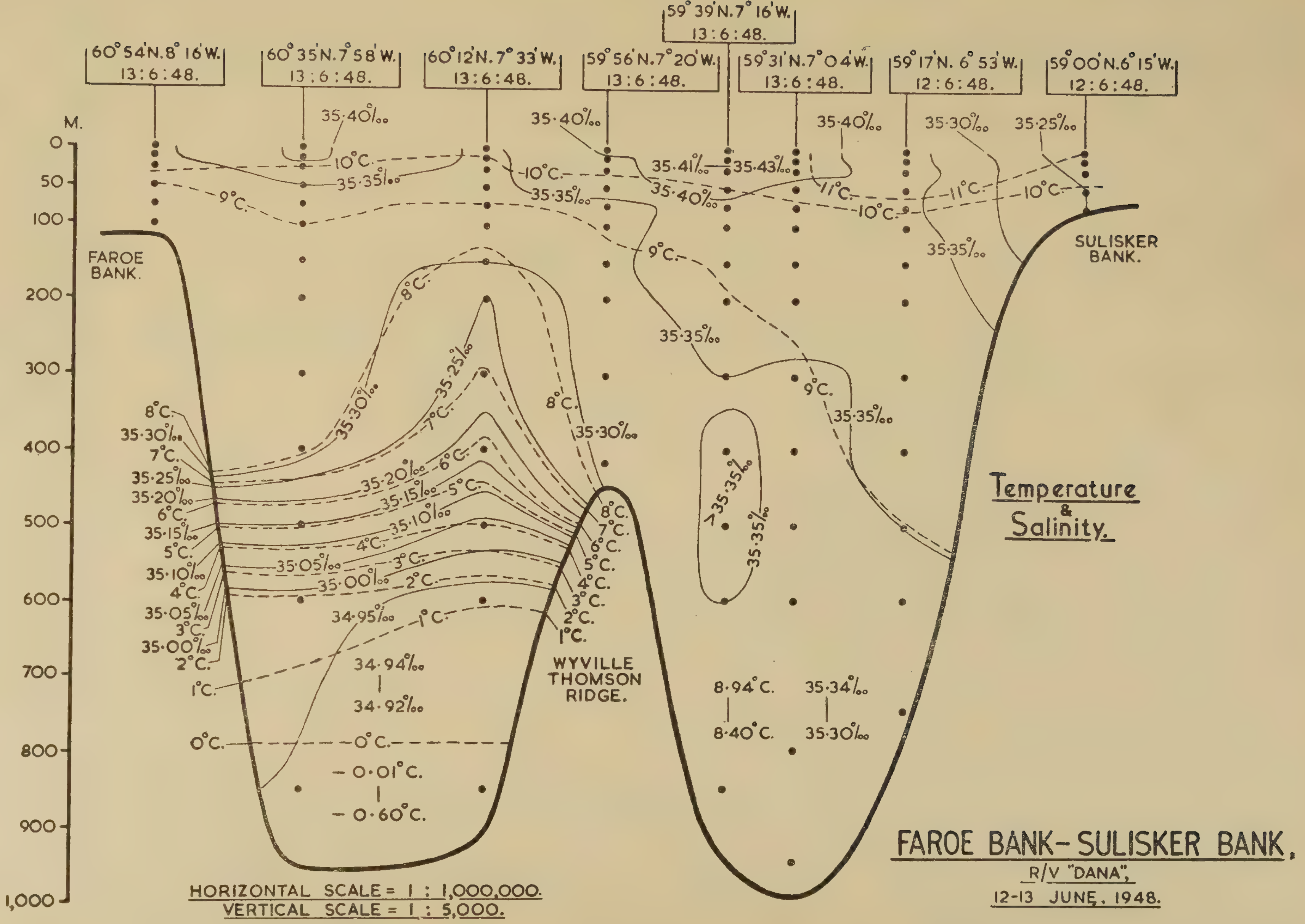

FAROE BANK-SULISKER BANK.
R/V "DANA".
12-13 JUNE, 1948.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
60°54'N. 8°16'W. 13:6:48.
60°35'N. 7°58'W. 13:6:48.
60°12'N. 7°33'W. 13:6:48.
59°56'N. 7°20'W. 13:6:48.
59°39'N. 7°16'W. 13:6:48.
59°31'N. 7°04'W. 13:6:48.
59°17'N. 6°53'W. 12:6:48.
59°00'N. 6°15'W. 12:6:48.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
FAROE BANK.
SULISKER BANK.
WYVILLE THOMSON RIDGE.
35·40‰
10°C.
35·35‰
9°C.
35·41‰
35·43‰
11°C.
35·30‰
35·25‰
8°C.
7°C.
35·20‰
6°C.
35·15‰
5°C.
35·10‰
4°C.
35·05‰
3°C.
35·00‰
2°C.
34·95‰
1°C.
0°C.
34·94‰
34·92‰
−0·01°C.
−0·60°C.
>35·35‰
8·94°C.
8·40°C.
35·34‰
35·30‰

Fig. 39

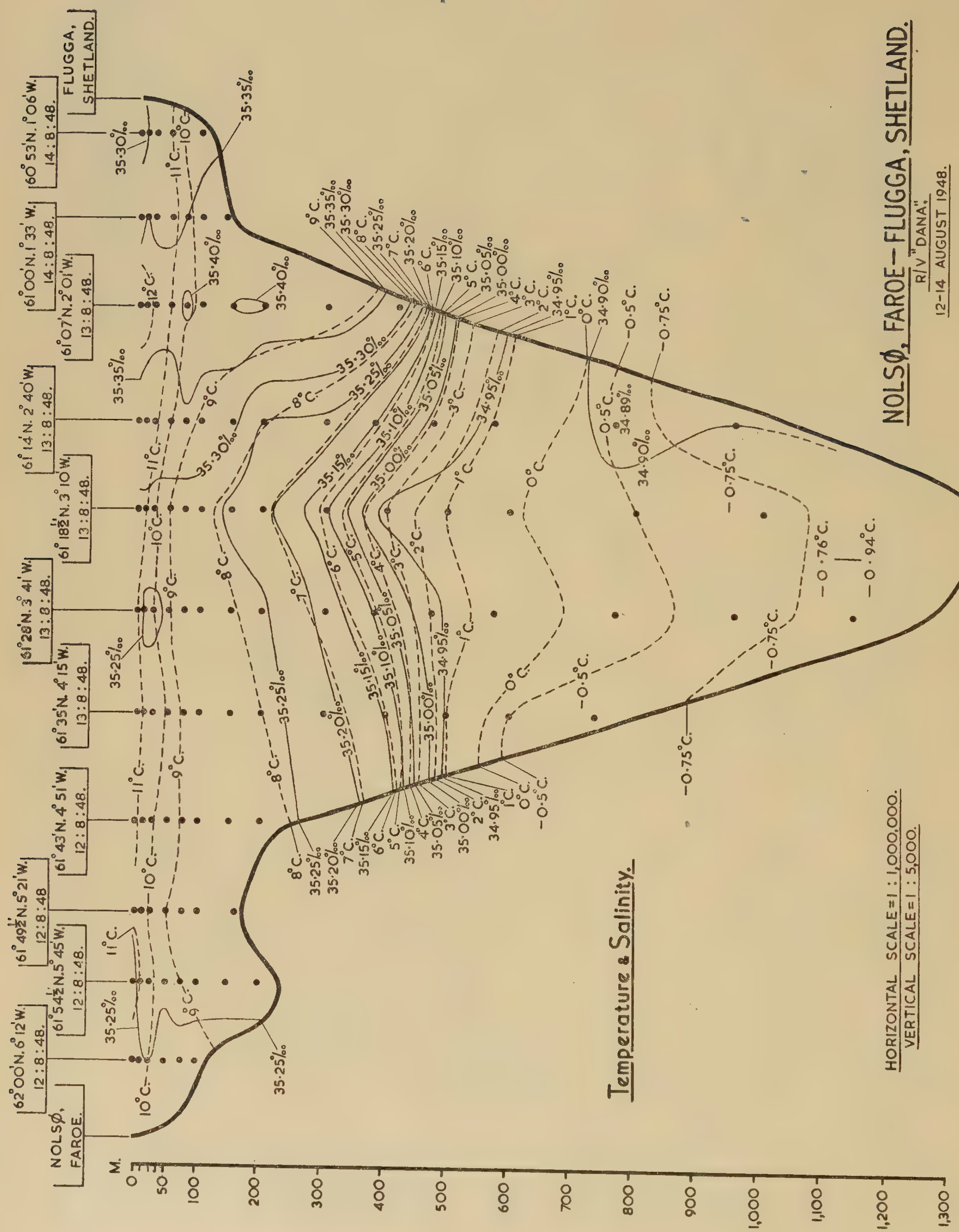
NOLSØ, FAROE—FLUGGA, SHETLAND.
R/V "DANA".
12-14 AUGUST 1948.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE.
62° 00'N. 6° 12'W. 12 : 8 : 48.
61° 54½'N. 5° 45'W. 12 : 8 : 48.
61° 49½'N. 5° 21'W. 12 : 8 : 48
61° 43'N. 4° 51'W. 12 : 8 : 48.
61° 35'N. 4° 15'W. 13 : 8 : 48.
61° 28'N. 3° 41'W. 13 : 8 : 48.
61° 18½'N. 3° 10'W. 13 : 8 : 48.
61° 14'N. 2° 40'W. 13 : 8 : 48.
61° 07'N. 2° 01'W. 13 : 8 : 48.
61° 00'N. 1° 33'W. 14 : 8 : 48.
60° 53'N. 1° 06'W. 14 : 8 : 48.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
10°C.
11°C.
12°C.
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
−0·5°C.
−0·75°C.
−0·76°C.
−0·94°C.
35·40‰
35·35‰
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·90‰
34·89‰

Fig. 40

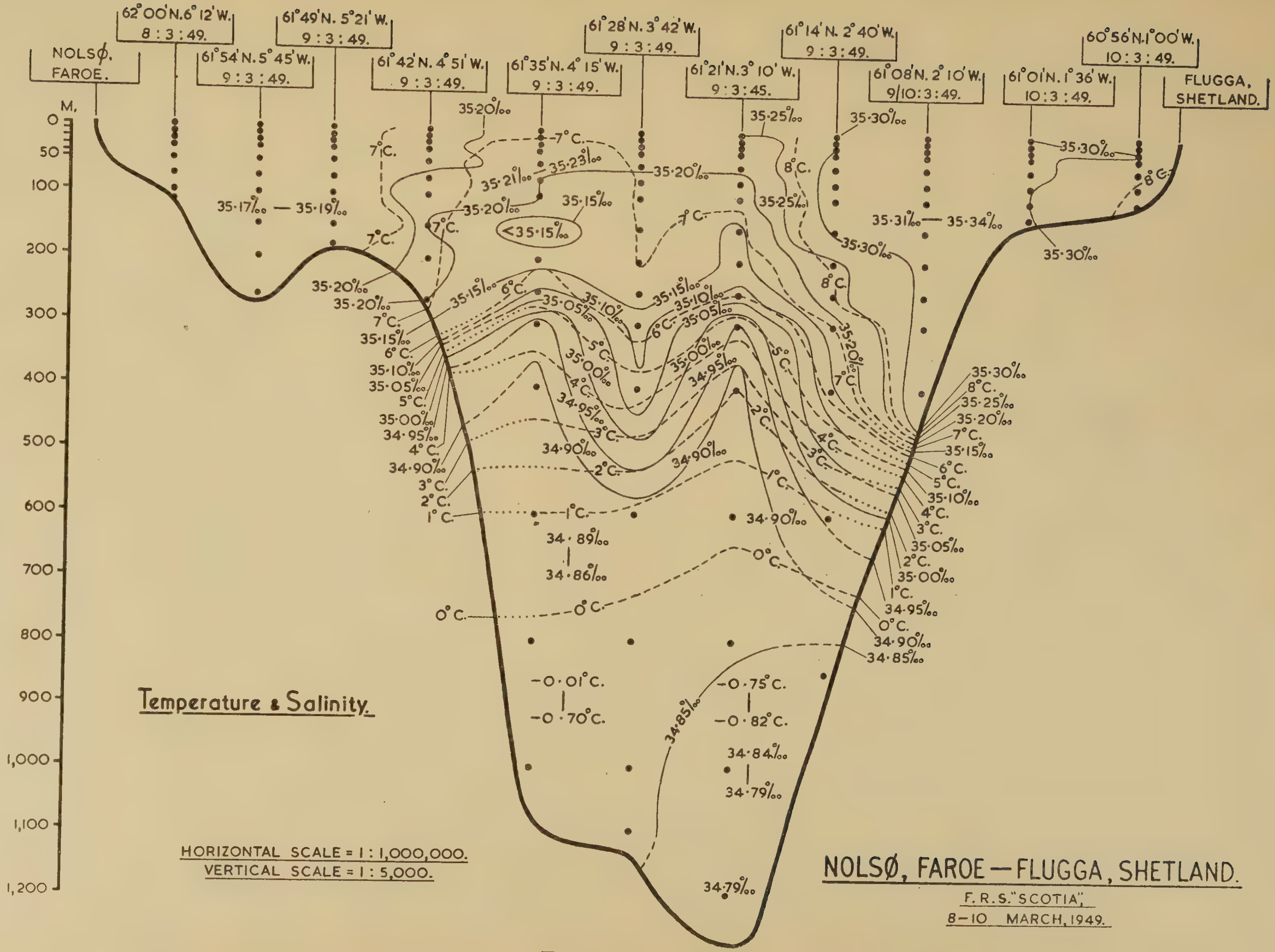
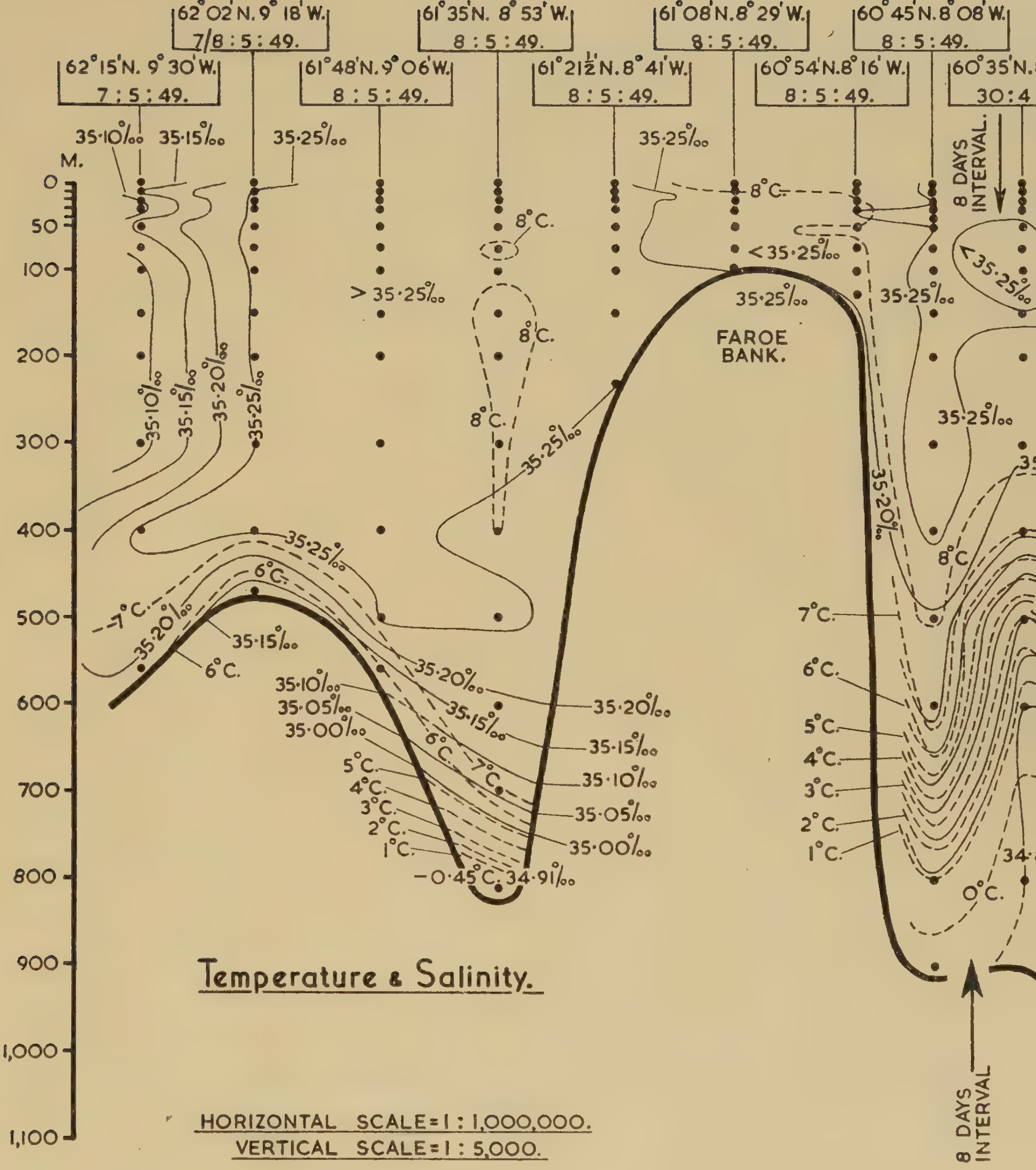
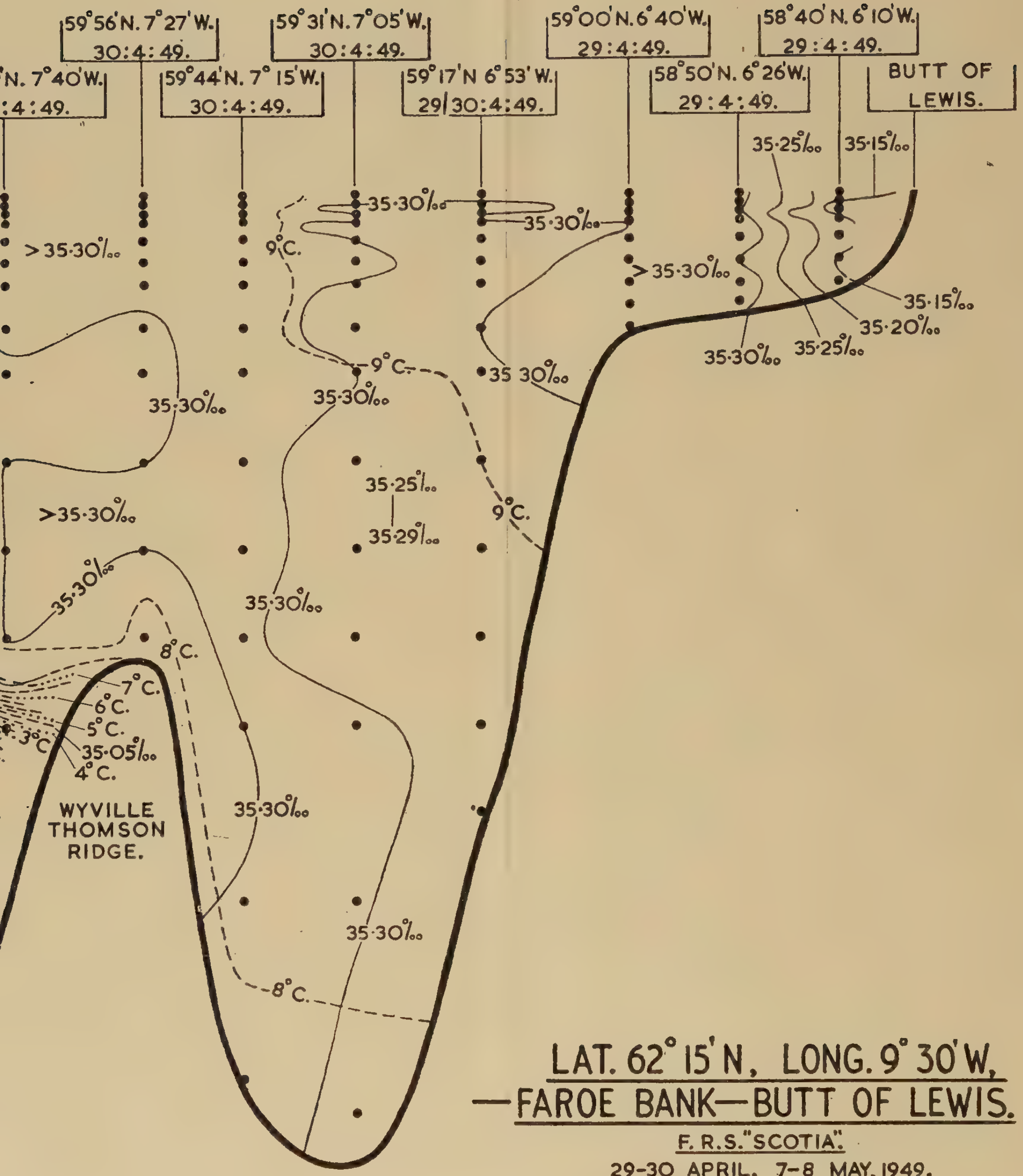

NOLSØ, FAROE—FLUGGA, SHETLAND.
F. R. S. "SCOTIA",
8–10 MARCH, 1949.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ. FAROE.
62° 00' N. 6° 12' W. 8 : 3 : 49.
61° 54' N. 5° 45' W. 9 : 3 : 49.
61° 49' N. 5° 21' W. 9 : 3 : 49.
61° 42' N. 4° 51' W. 9 : 3 : 49.
61° 35' N. 4° 15' W. 9 : 3 : 49.
61° 28' N. 3° 42' W. 9 : 3 : 49.
61° 21' N. 3° 10' W. 9 : 3 : 45.
61° 14' N. 2° 40' W. 9 : 3 : 49.
61° 08' N. 2° 10' W. 9/10 : 3 : 49.
61° 01' N. 1° 36' W. 10 : 3 : 49.
60° 56' N. 1° 00' W. 10 : 3 : 49.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
35·17‰ — 35·19‰
<35·15‰
35·15‰
35·31‰ — 35·34‰
34·89‰ | 34·86‰
−0·01° C. | −0·70° C.
−0·75° C. | −0·82° C.
34·84‰ | 34·79‰
34·79‰
34·85‰
34·90‰
0° C.
1° C.
2° C.
3° C.
4° C.
5° C.
6° C.
7° C.
8° C.
35·00‰
35·05‰
35·10‰
35·15‰
35·20‰
35·21‰
35·23‰
35·25‰
35·30‰
34·95‰

Fig. 41



Temperature & Salinity.

HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.



LAT. 62° 15'N, LONG. 9° 30'W,

—FAROE BANK—BUTT OF LEWIS.

F. R. S. "SCOTIA".

29–30 APRIL, 7–8 MAY, 1949.

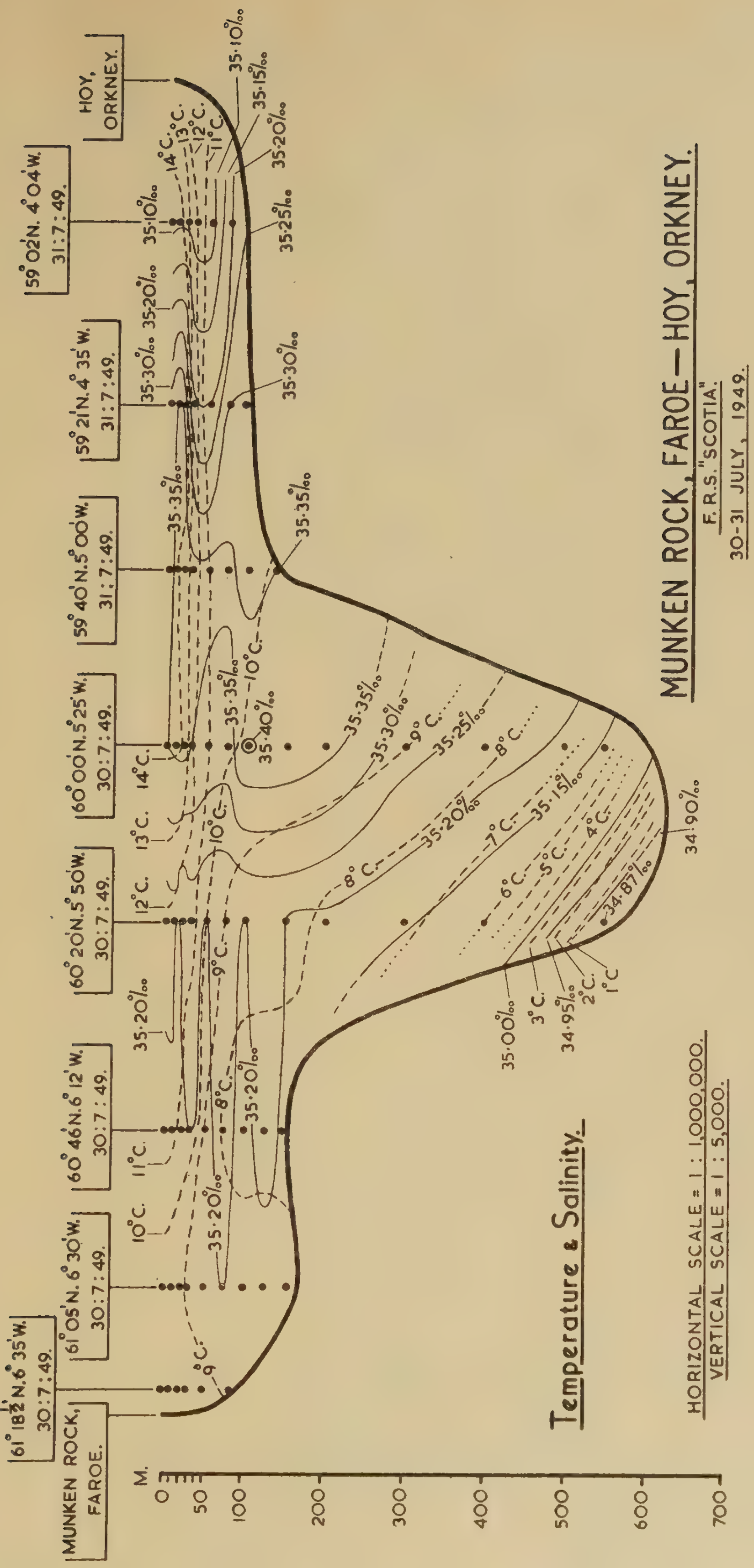
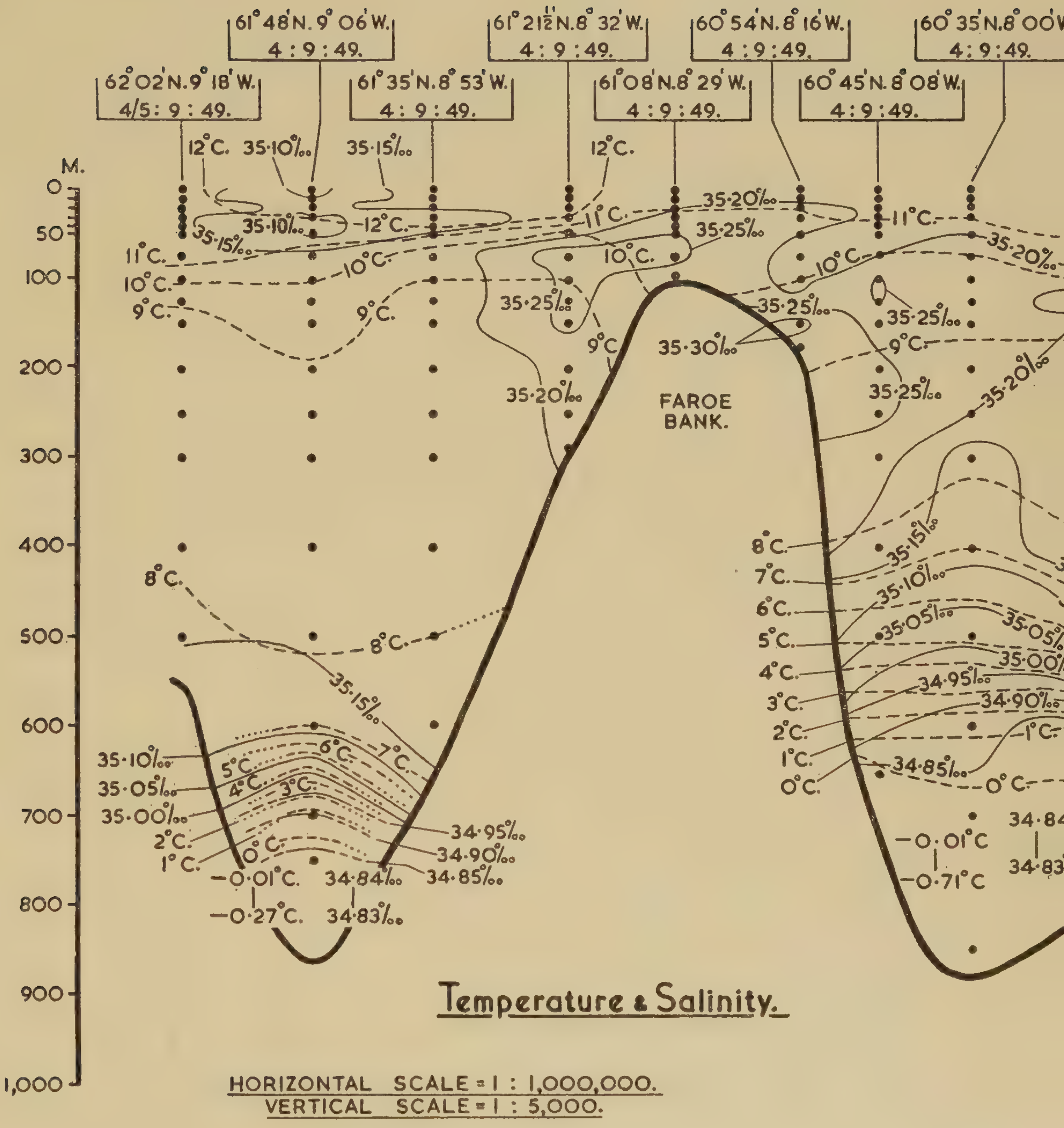
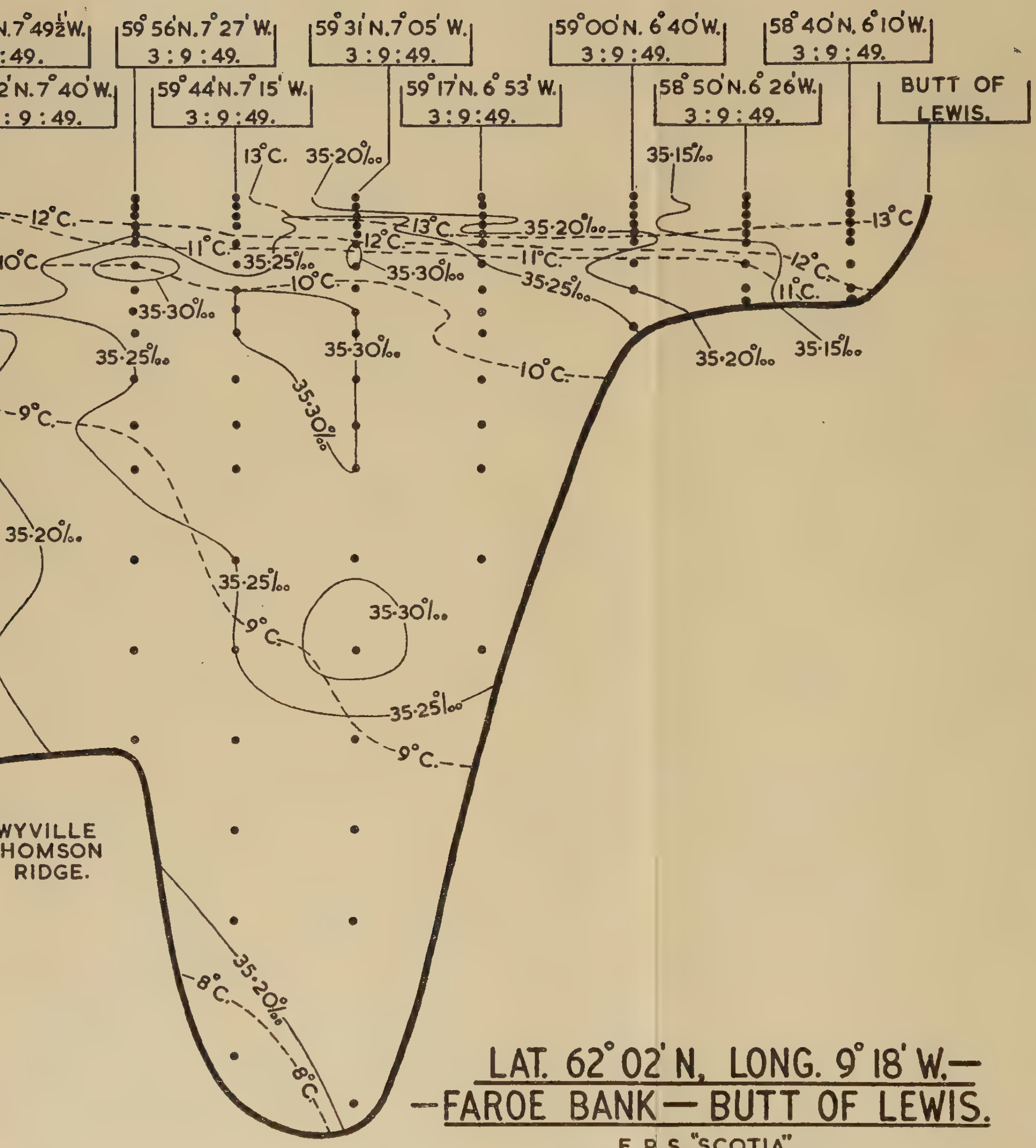

MUNKEN ROCK, FAROE—HOY, ORKNEY.
F.R.S. "SCOTIA."
30-31 JULY, 1949.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
MUNKEN ROCK, FAROE.
61° 18½' N. 6° 35' W. 30 : 7 : 49.
61° 05' N. 6° 30' W. 30 : 7 : 49.
60° 46' N. 6° 12' W. 30 : 7 : 49.
60° 20' N. 5° 50' W. 30 : 7 : 49.
60° 00' N. 5° 25' W. 30 : 7 : 49.
59° 40' N. 5° 00' W. 31 : 7 : 49.
59° 21' N. 4° 35' W. 31 : 7 : 49.
59° 02' N. 4° 04' W. 31 : 7 : 49.
HOY, ORKNEY.
M.
0
50
100
200
300
400
500
600
700
9°C.
10°C.
11°C.
12°C.
13°C.
14°C.
8°C.
9°C.
10°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
35·10‰
35·15‰
35·20‰
35·25‰
35·30‰
35·35‰
35·40‰
35·00‰
34·95‰
34·90‰
34·87‰

Fig. 43



Temperature & Salinity.

HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.



LAT. 62° 02' N, LONG. 9° 18' W.—
—FAROE BANK — BUTT OF LEWIS.

F. R. S. "SCOTIA."
3-5 SEPTEMBER, 1949.

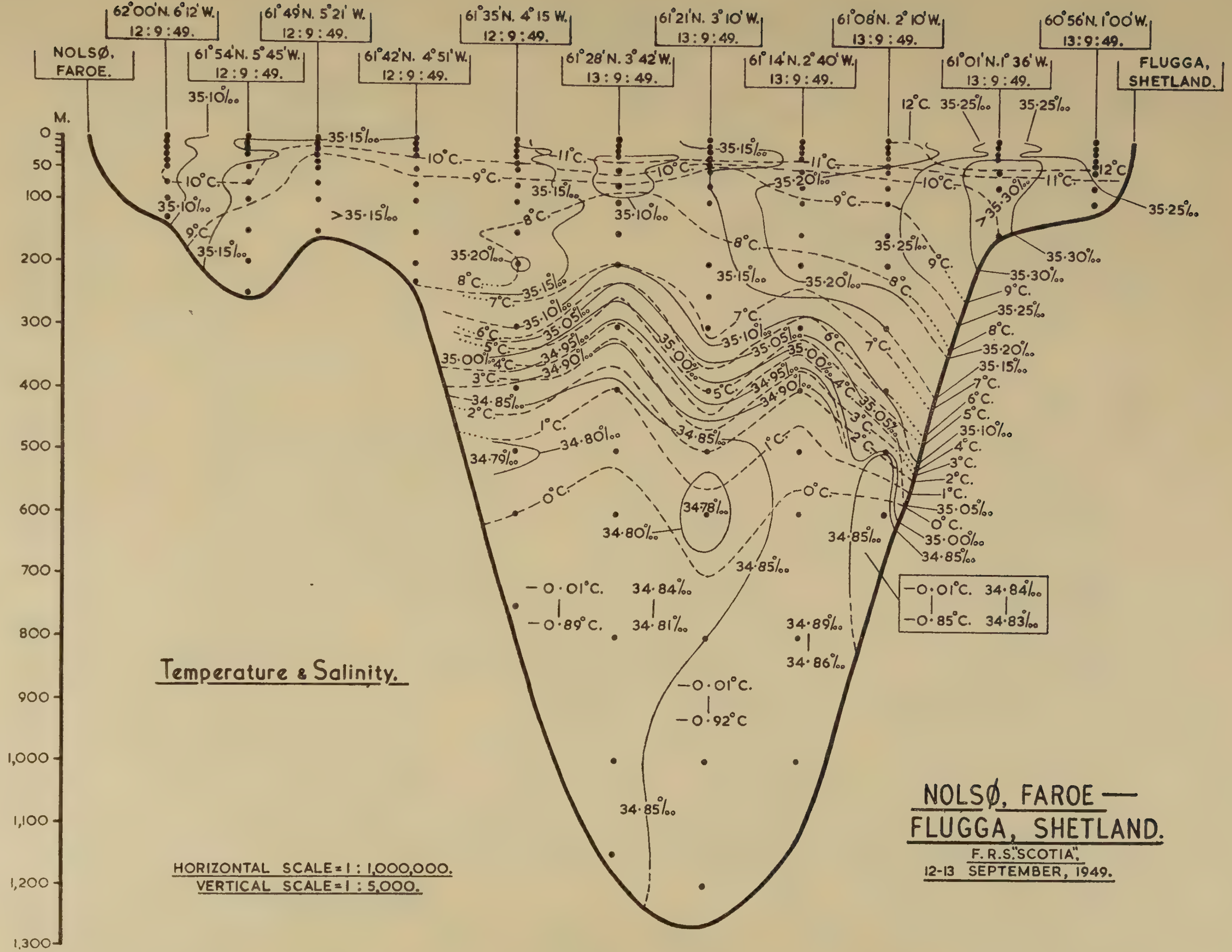
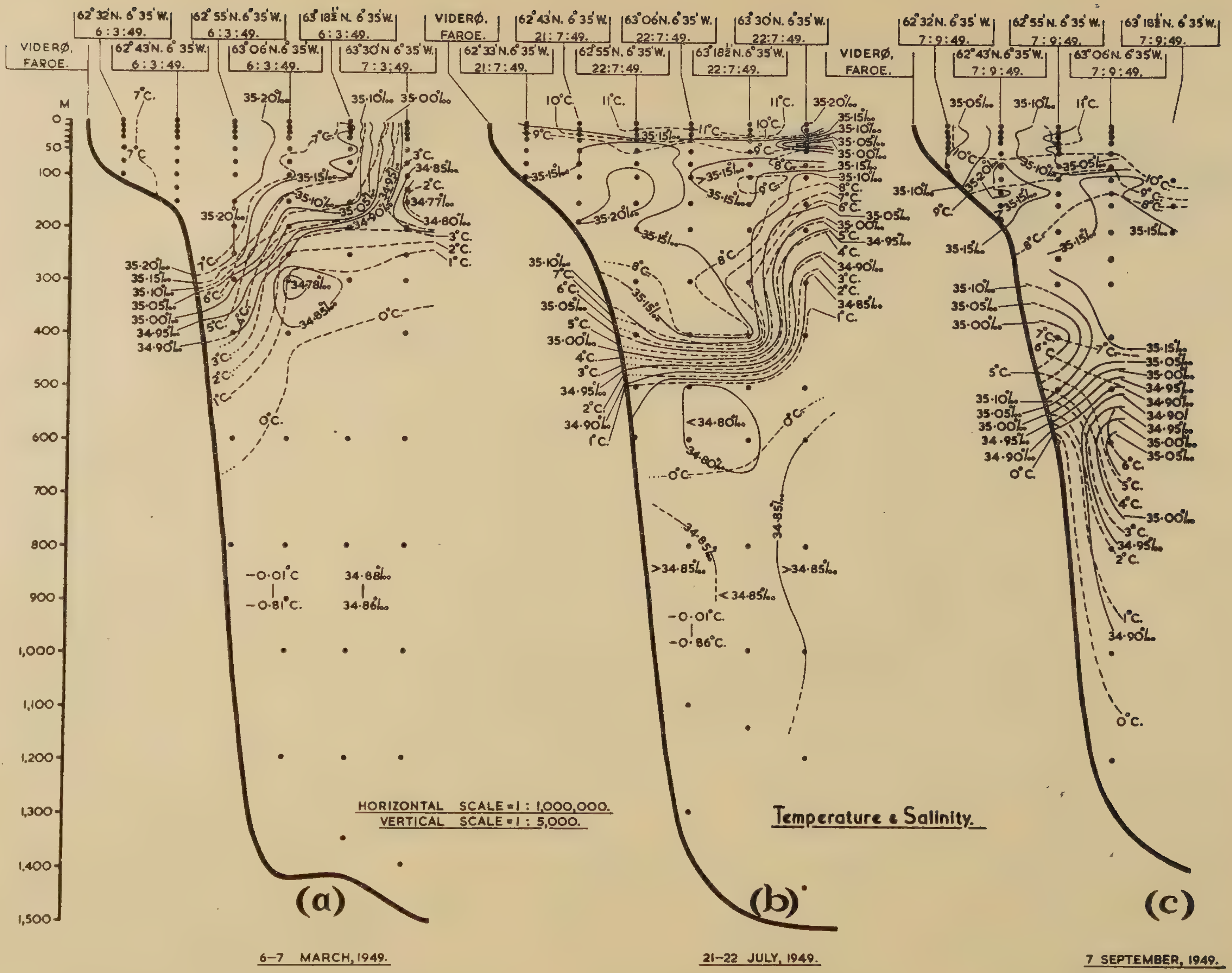

NOLSØ, FAROE.
62°00'N. 6°12'W. 12:9:49.
61°54'N. 5°45'W. 12:9:49.
61°49'N. 5°21'W. 12:9:49.
61°42'N. 4°51'W. 12:9:49.
61°35'N. 4°15'W. 12:9:49.
61°28'N. 3°42'W. 13:9:49.
61°21'N. 3°10'W. 13:9:49.
61°14'N. 2°40'W. 13:9:49.
61°08'N. 2°10'W. 13:9:49.
61°01'N. 1°36'W. 13:9:49.
60°56'N. 1°00'W. 13:9:49.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
35·10‰
35·15‰
>35·15‰
35·20‰
35·25‰
35·30‰
35·05‰
35·00‰
34·95‰
34·90‰
34·85‰
34·80‰
34·79‰
34·78‰
12°C.
11°C.
10°C.
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
−0·01°C. 34·84‰
−0·89°C. 34·81‰
34·89‰
34·86‰
−0·01°C.
−0·92°C
−0·01°C. 34·84‰
−0·85°C. 34·83‰
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE — FLUGGA, SHETLAND.
F.R.S. "SCOTIA".
12-13 SEPTEMBER, 1949.

FIG. 45



VIDERØ, FAROE ——→ NORTHWARD ON LONGITUDE 6° 35' W.

F. R. S. "SCOTIA".

Fig. 46

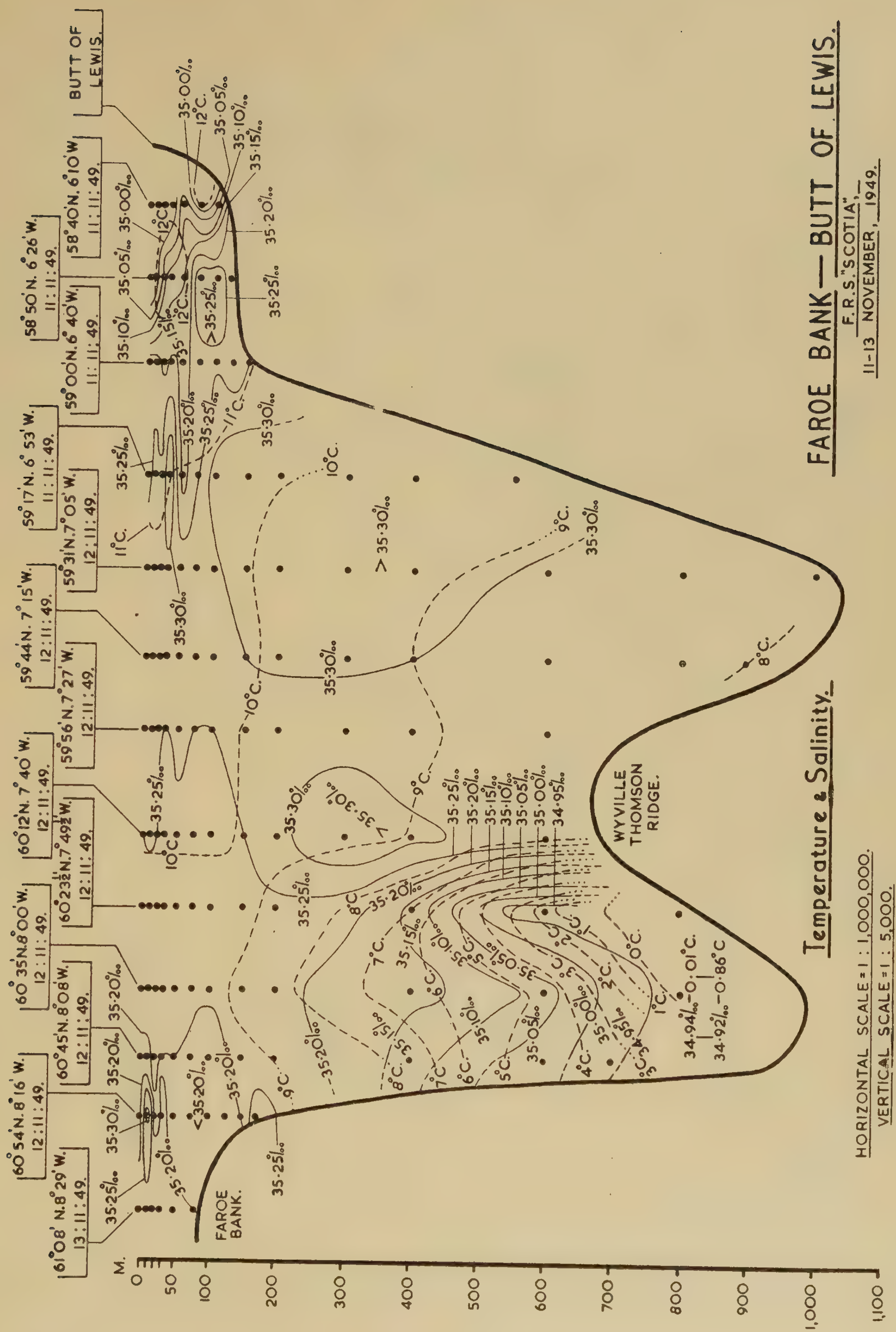

FAROE BANK — BUTT OF LEWIS.
F.R.S. "SCOTIA", 11-13 NOVEMBER, 1949.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
61°08' N. 8°29' W. 13:11:49.
60°54' N. 8°16' W. 12:11:49.
60°45' N. 8°08' W. 12:11:49.
60°35' N. 8°00' W. 12:11:49.
60°23½' N. 7°49½' W. 12:11:49.
60°12' N. 7°40' W. 12:11:49.
59°56' N. 7°27' W. 12:11:49.
59°44' N. 7°15' W. 12:11:49.
59°31' N. 7°05' W. 12:11:49.
59°17' N. 6°53' W. 11:11:49.
59°00' N. 6°40' W. 11:11:49.
58°50' N. 6°26' W. 11:11:49.
58°40' N. 6°10' W. 11:11:49.
BUTT OF LEWIS.
FAROE BANK.
WYVILLE THOMSON RIDGE.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
35·25‰
35·30‰
35·20‰
<35·20‰
>35·25‰
>35·30‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·94‰ −0·01°C
34·92‰ −0·86°C
12°C.
11°C.
10°C.
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.

FIG. 47

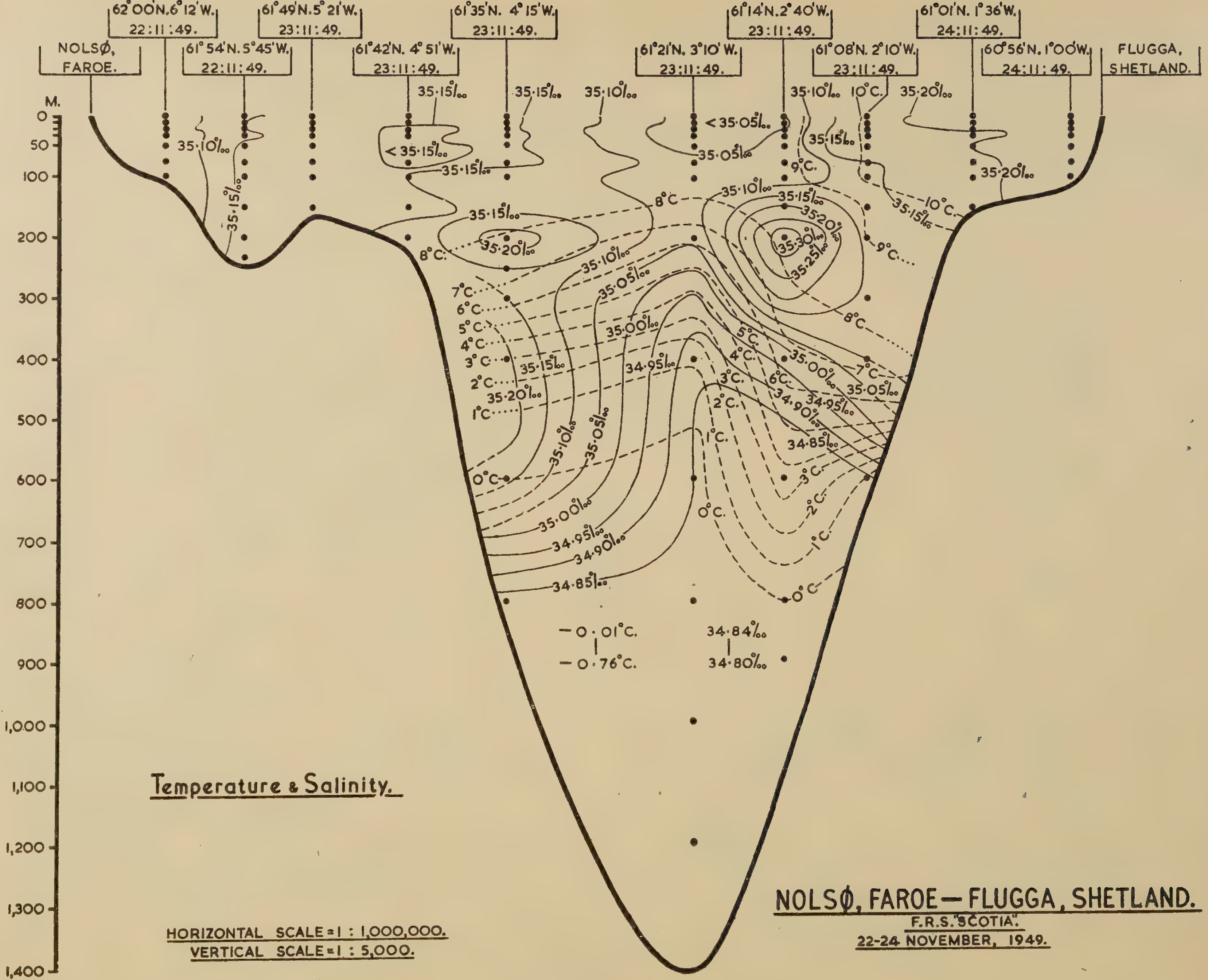
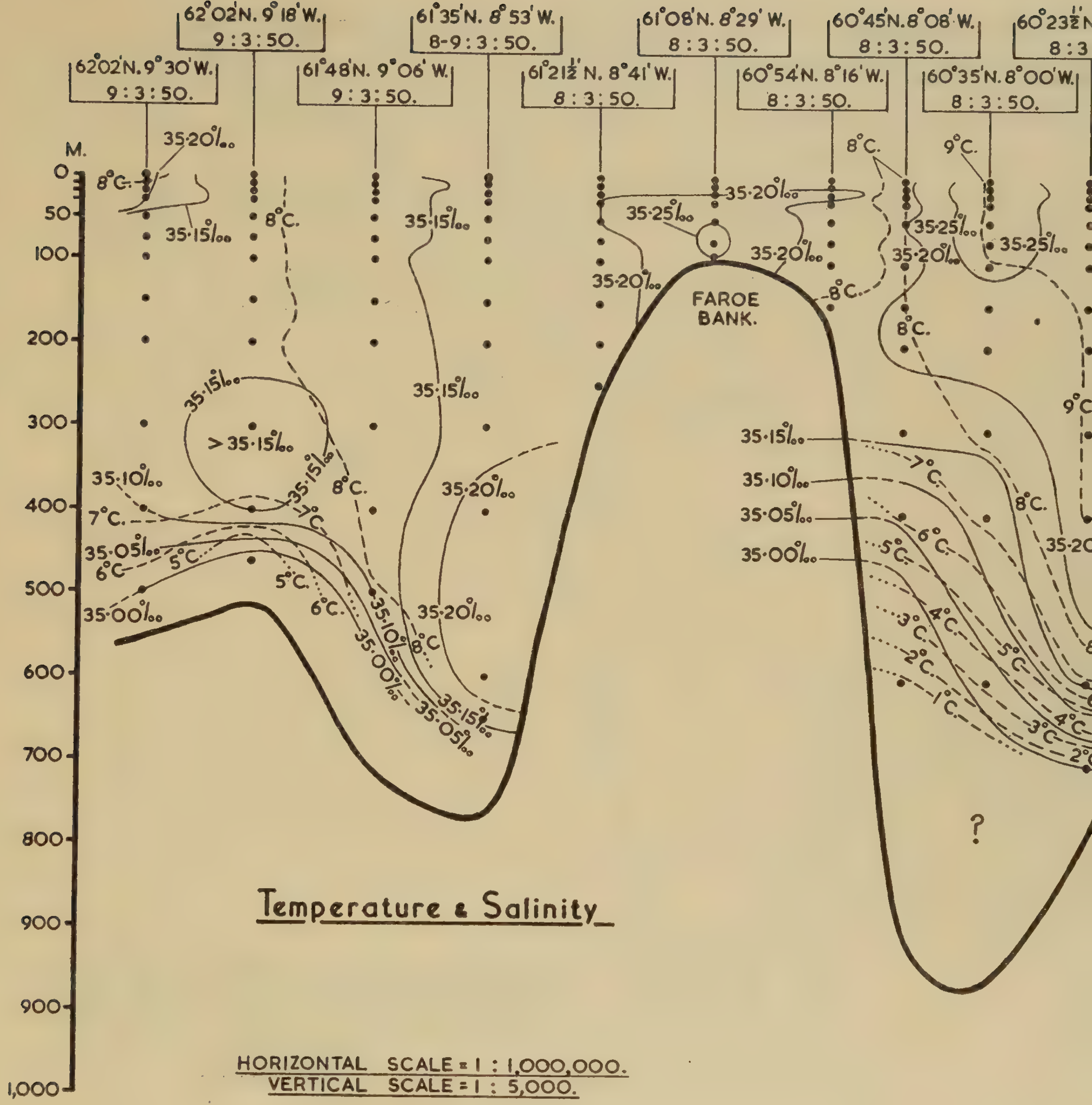
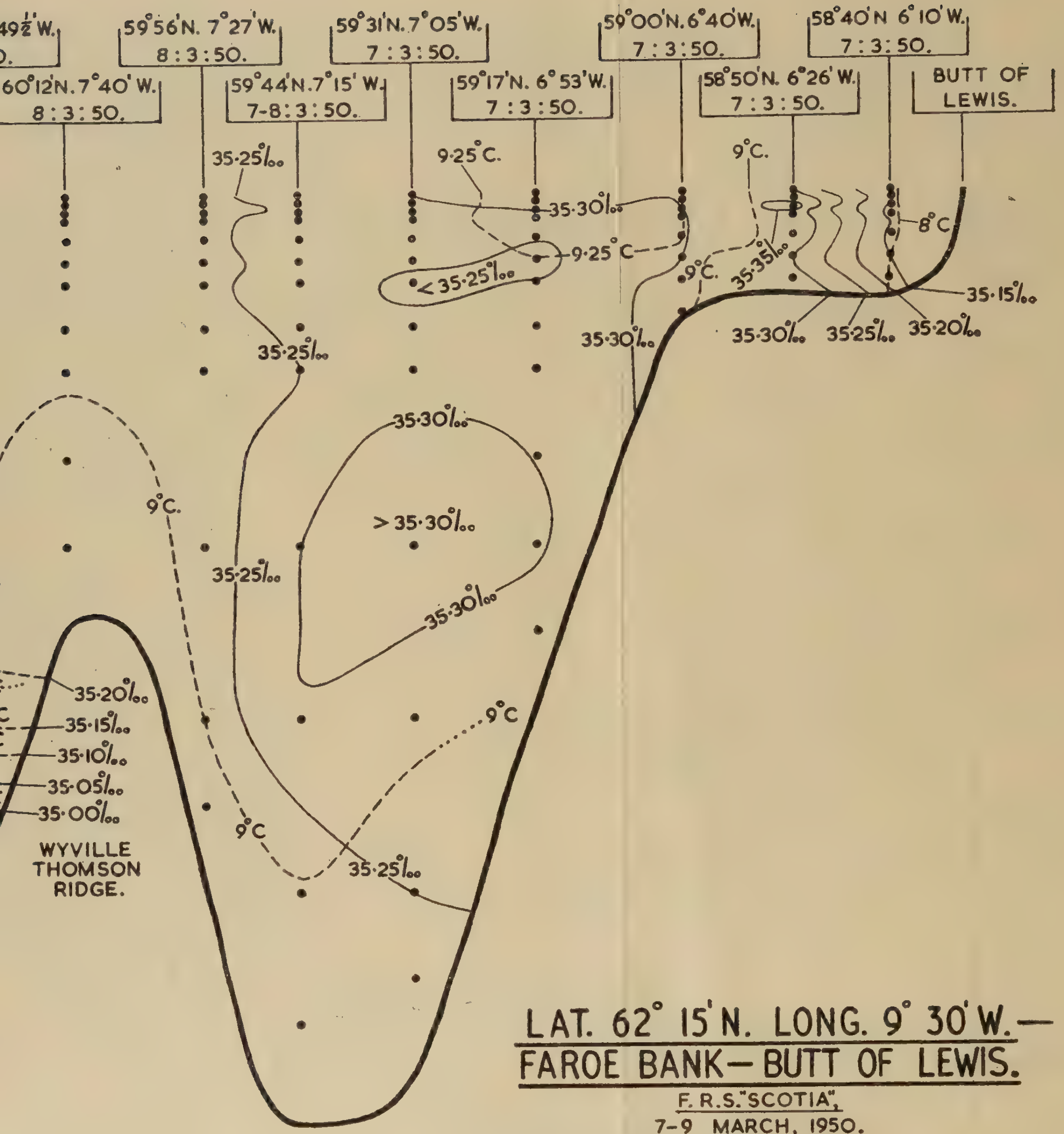

NOLSØ, FAROE.
62°00'N. 6°12'W. 22:11:49.
61°54'N. 5°45'W. 22:11:49.
61°49'N. 5°21'W. 23:11:49.
61°42'N. 4°51'W. 23:11:49.
61°35'N. 4°15'W. 23:11:49.
61°21'N. 3°10'W. 23:11:49.
61°14'N. 2°40'W. 23:11:49.
61°08'N. 2°10'W. 23:11:49.
61°01'N. 1°36'W. 24:11:49.
60°56'N. 1°00'W. 24:11:49.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
1,400
35·10‰
35·15‰
< 35·15‰
35·20‰
< 35·05‰
35·05‰
35·25‰
35·30‰
35·00‰
34·95‰
34·90‰
34·85‰
10°C.
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
−0·01°C.
−0·76°C.
34·84‰
34·80‰
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE—FLUGGA, SHETLAND.
F.R.S. "SCOTIA".
22-24 NOVEMBER, 1949.

Fig. 48

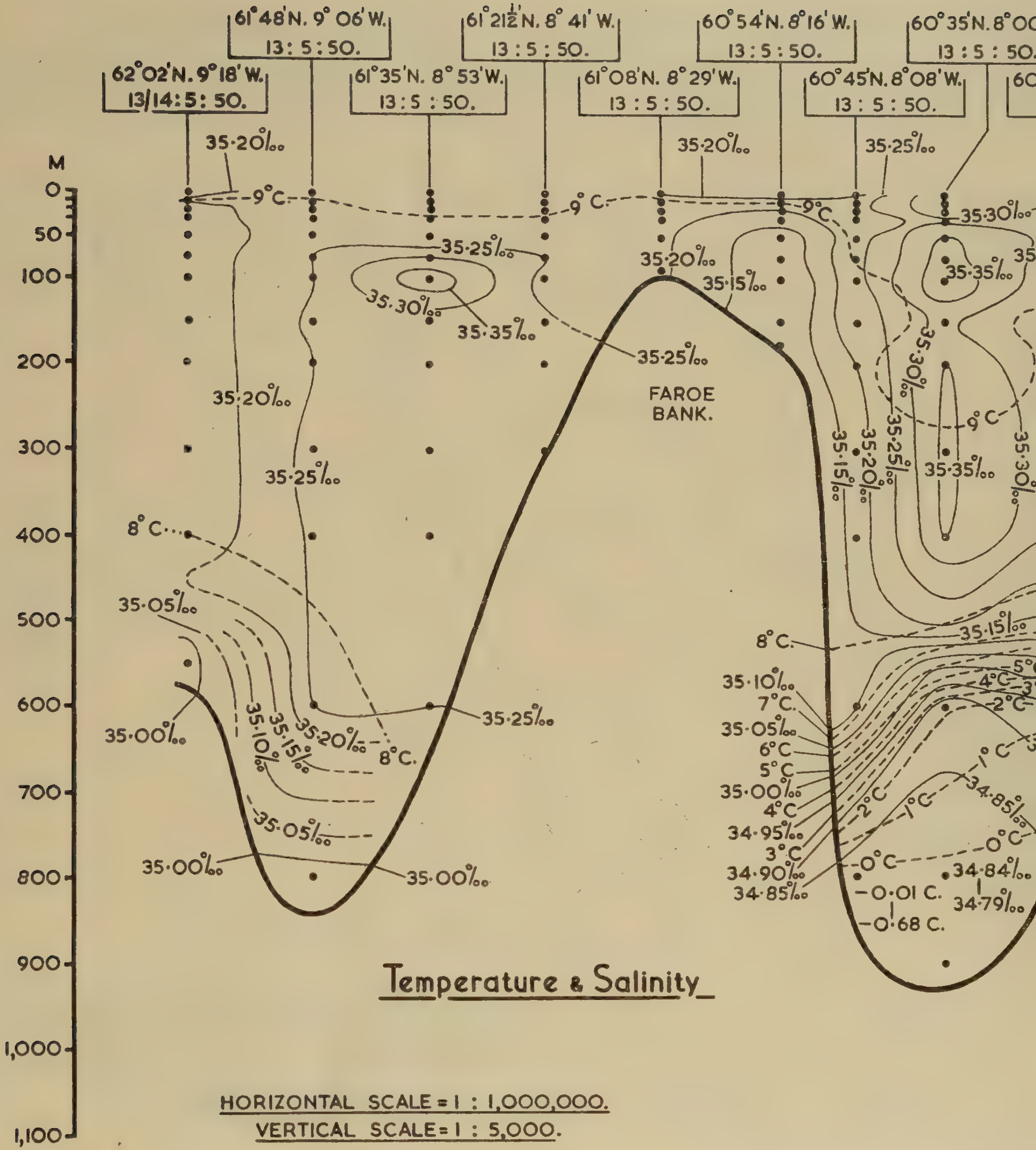

62°02'N. 9°18'W.
9:3:50.
61°35'N. 8°53'W.
8-9:3:50.
61°08'N. 8°29'W.
8:3:50.
60°45'N. 8°08'W.
8:3:50.
60°23½'N
8:3
62°02'N. 9°30'W.
9:3:50.
61°48'N. 9°06'W.
9:3:50.
61°21½'N. 8°41'W.
8:3:50.
60°54'N. 8°16'W.
8:3:50.
60°35'N. 8°00'W.
8:3:50.
M.
0
50
100
200
300
400
500
600
700
800
900
900
1,000
35·20‰
8°C.
35·15‰
8°C.
35·15‰
35·25‰
35·20‰
35·20‰
35·20‰
FAROE BANK.
8°C.
9°C.
35·25‰
35·25‰
35·20‰
8°C.
8°C.
35·15‰
>35·15‰
35·15‰
35·15‰
35·10‰
7°C.
35·05‰
5°C.
6°C.
35·00‰
8°C.
7°C.
5°C.
6°C.
35·10‰
35·00‰
8°C
35·20‰
35·20‰
35·15‰
35·05‰
35·15‰
35·10‰
35·05‰
35·00‰
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
5°C.
4°C.
3°C.
2°C
8°C.
9°C
35·20
?
Temperature & Salinity
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.

Fi



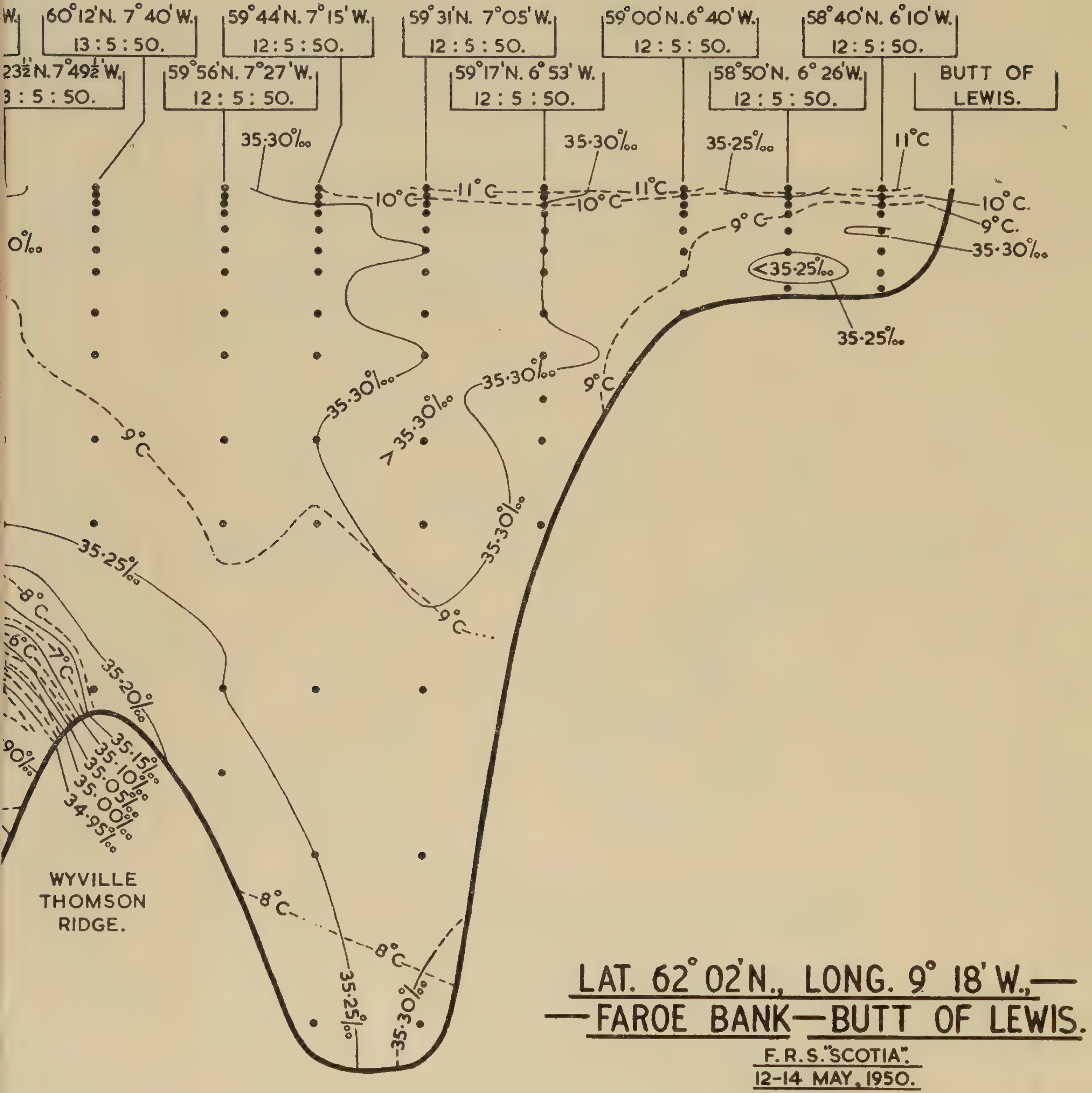
LAT. 62° 15' N. LONG. 9° 30' W.— FAROE BANK—BUTT OF LEWIS.

F. R. S. "SCOTIA",
7–9 MARCH, 1950.



Temperature & Salinity

HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.



LAT. 62° 02'N., LONG. 9° 18' W.—
—FAROE BANK—BUTT OF LEWIS.
F. R. S. "SCOTIA".
12-14 MAY, 1950.

IG. 50

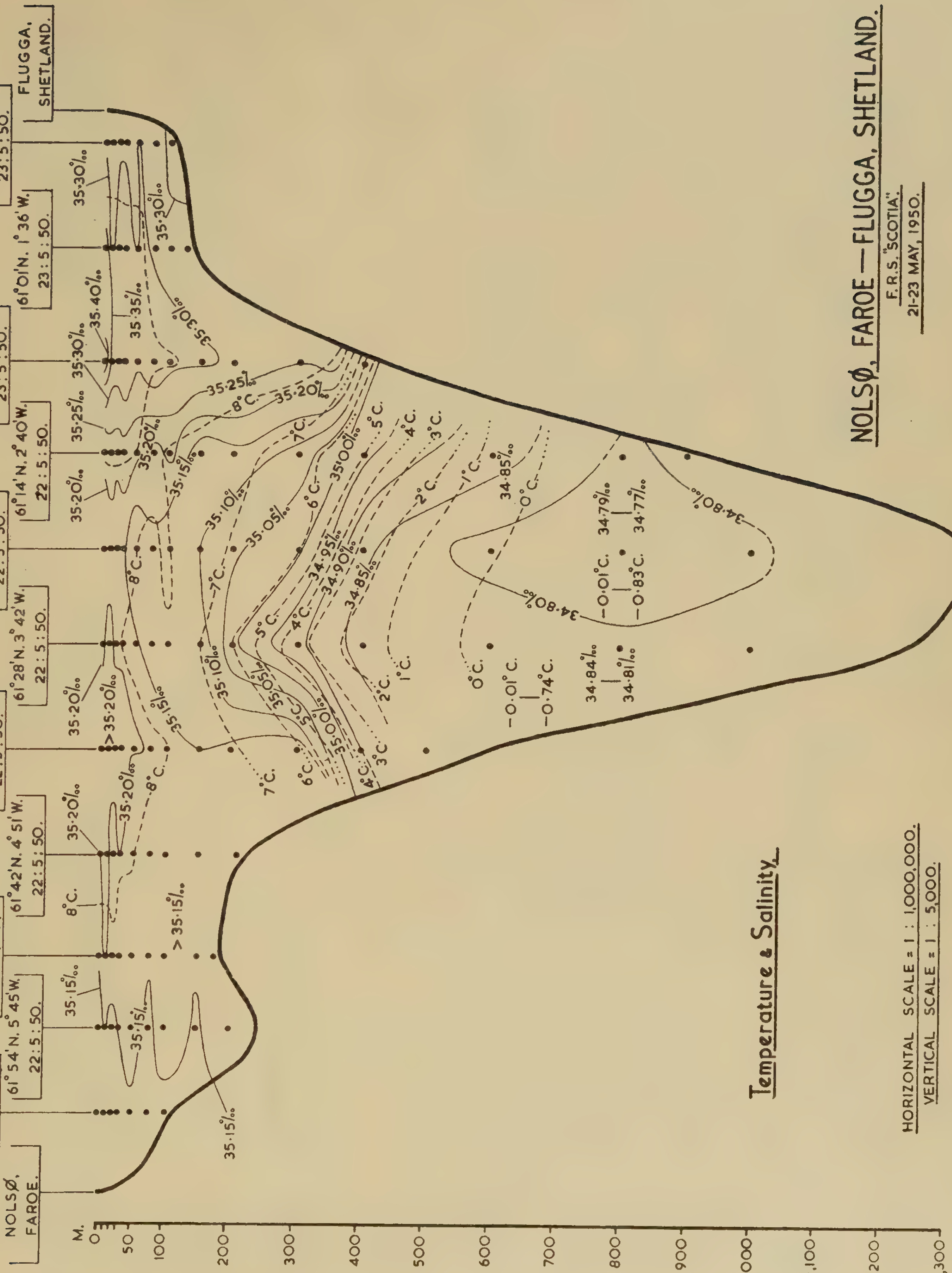

NOLSØ, FAROE—FLUGGA, SHETLAND.
F.R.S. "SCOTIA".
21-23 MAY, 1950.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE.
62°00'N. 6°12'W. 21:5:50.
61°54'N. 5°45'W. 22:5:50.
61°49'N. 5°21'W. 22:5:50.
61°42'N. 4°51'W. 22:5:50.
61°35'N. 4°15'W. 22:5:50.
61°28'N. 3°42'W. 22:5:50.
61°21'N. 3°10'W. 22:5:50.
61°14'N. 2°40'W. 22:5:50.
61°08'N. 2°10'W. 23:5:50.
61°01'N. 1°36'W. 23:5:50.
60°56'N. 1°00'W. 23:5:50.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
35·15‰
35·15‰
35·15‰
8°C.
>35·15‰
35·20‰
35·20‰
35·20‰
>35·20‰
8°C.
35·15‰
7°C.
6°C.
5°C.
4°C.
3°C.
35·10‰
35·05‰
35·00‰
2°C.
1°C.
0°C.
−0·01°C.
−0·74°C.
34·84‰
34·81‰
8°C.
7°C.
5°C.
4°C.
34·95‰
34·90‰
34·85‰
35·10‰
35·05‰
6°C.
−0·01°C.
−0·83°C.
34·79‰
34·77‰
34·80‰
34·80‰
35·20‰
35·25‰
35·15‰
35·20‰
35·25‰
8°C.
35·20‰
7°C.
35·00‰
5°C.
4°C.
3°C.
2°C.
1°C.
34·85‰
0°C.
35·30‰
35·40‰
35·35‰
35·30‰
35·30‰
35·30‰

FIG. 51

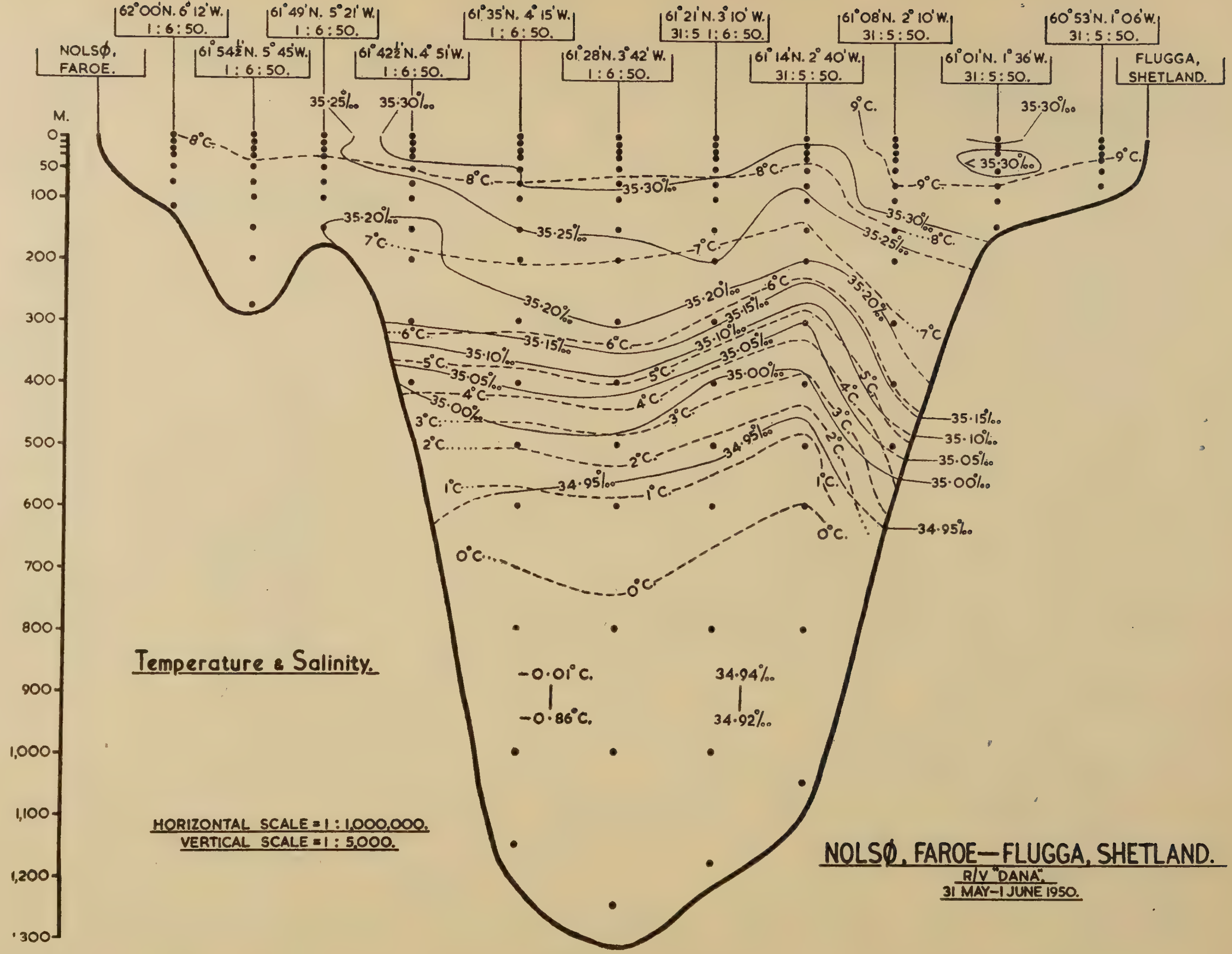

NOLSØ, FAROE.
62°00'N. 6°12'W. 1:6:50.
61°54½'N. 5°45'W. 1:6:50.
61°49'N. 5°21'W. 1:6:50.
61°42½'N. 4°51'W. 1:6:50.
61°35'N. 4°15'W. 1:6:50.
61°28'N. 3°42'W. 1:6:50.
61°21'N. 3°10'W. 31:5 1:6:50.
61°14'N. 2°40'W. 31:5:50.
61°08'N. 2°10'W. 31:5:50.
61°01'N. 1°36'W. 31:5:50.
60°53'N. 1°06'W. 31:5:50.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1300
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
35·30‰
< 35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
−0·01°C.
−0·86°C.
34·94‰
34·92‰
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE—FLUGGA, SHETLAND.
R/V "DANA".
31 MAY–1 JUNE 1950.

FIG. 52

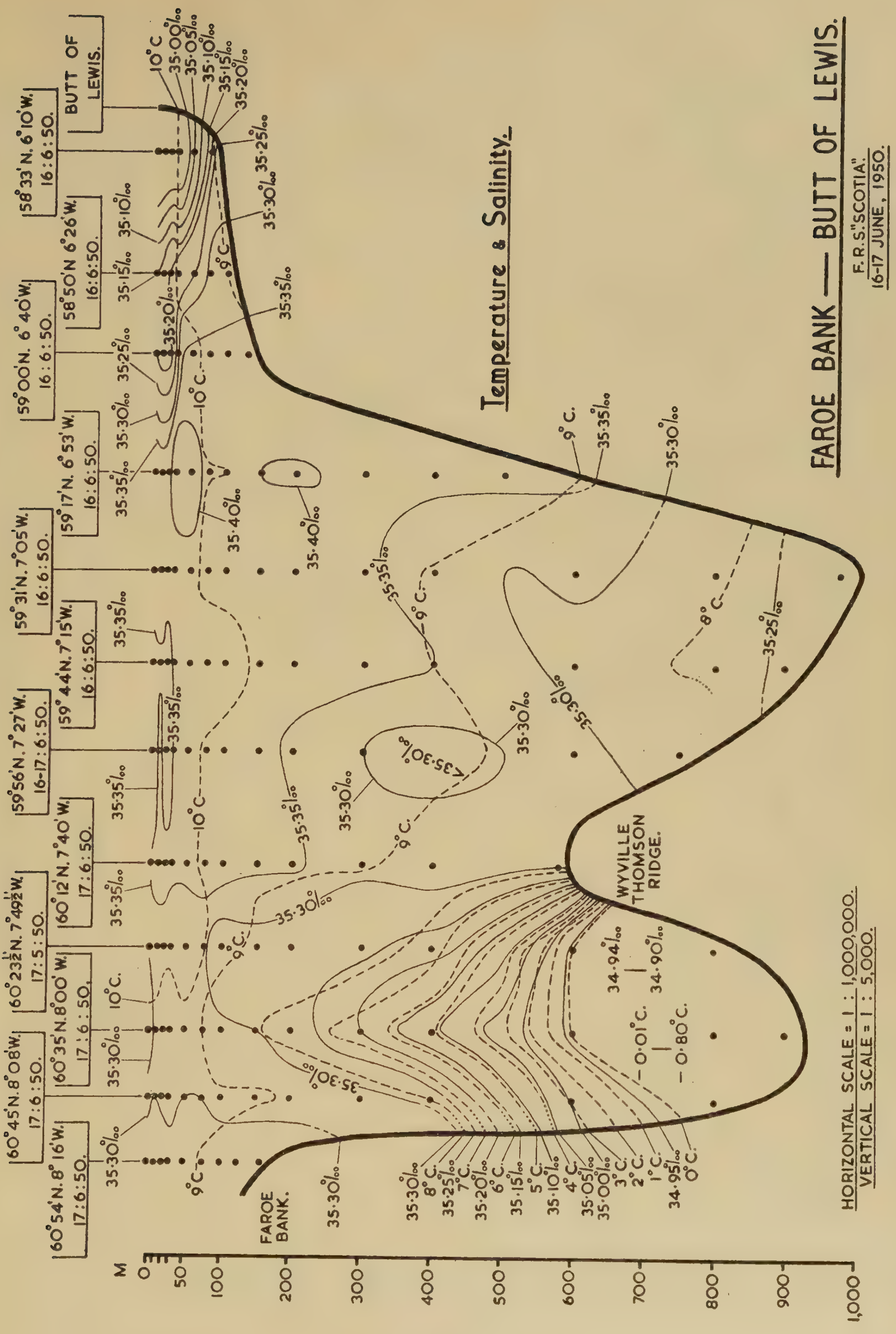

FAROE BANK —— BUTT OF LEWIS.
F.R.S. "SCOTIA."
16-17 JUNE, 1950.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
60°54'N. 8°16'W. 17:6:50.
60°45'N. 8°08'W. 17:6:50.
60°35'N. 8°00'W. 17:6:50.
60°23½'N. 7°49½'W. 17:5:50.
60°12'N. 7°40'W. 17:6:50.
59°56'N. 7°27'W. 16-17:6:50.
59°44'N. 7°15'W. 16:6:50.
59°31'N. 7°05'W. 16:6:50.
59°17'N. 6°53'W. 16:6:50.
59°00'N. 6°40'W. 16:6:50.
58°50'N. 6°26'W. 16:6:50.
58°33'N. 6°10'W. 16:6:50.
BUTT OF LEWIS.
FAROE BANK.
WYVILLE THOMSON RIDGE.
M
0
50
100
200
300
400
500
600
700
800
900
1,000
10°C
9°C
8°C
7°C
6°C
5°C
4°C
3°C
2°C
1°C
0°C
-0·01°C.
-0·80°C.
35·00‰
35·05‰
35·10‰
35·15‰
35·20‰
35·25‰
35·30‰
35·35‰
35·40‰
<35·30‰
34·95‰
34·94‰
34·90‰

Fig. 53

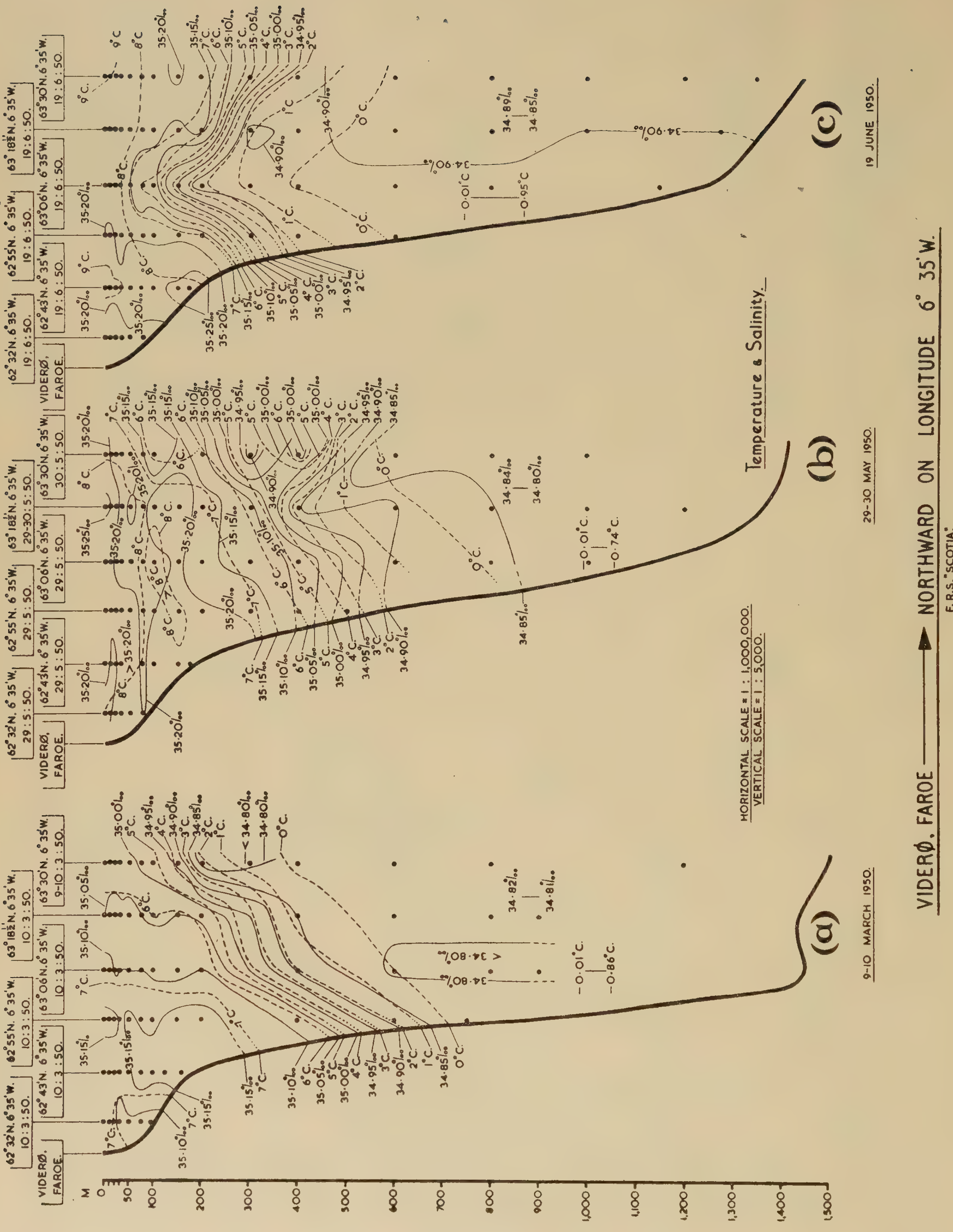

VIDERØ, FAROE
62° 32'N. 6° 35'W. 10:3:50.
62° 43'N. 6° 35'W. 10:3:50.
62° 55'N. 6° 35'W. 10:3:50.
63° 06'N. 6° 35'W. 10:3:50.
63° 18½'N. 6° 35'W. 10:3:50.
63° 30'N. 6° 35'W. 9-10:3:50.
62° 32'N. 6° 35'W. 29:5:50.
62° 43'N. 6° 35'W. 29:5:50.
62° 55'N. 6° 35'W. 29:5:50.
63° 06'N. 6° 35'W. 29:5:50.
63° 18½'N. 6° 35'W. 29-30:5:50.
63° 30'N. 6° 35'W. 30:5:50.
62° 32'N. 6° 35'W. 19:6:50.
62° 43'N. 6° 35'W. 19:6:50.
62° 55'N. 6° 35'W. 19:6:50.
63° 06'N. 6° 35'W. 19:6:50.
63° 18½'N. 6° 35'W. 19:6:50.
63° 30'N. 6° 35'W. 19:6:50.
M
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
1,400
1,500
(a)
9-10 MARCH 1950.
(b)
29-30 MAY 1950.
(c)
19 JUNE 1950.
-0.01°C.
-0.86°C.
-0.01°C.
-0.74°C.
-0.01°C
-0.95°C
34.82‰
34.81‰
34.84‰
34.80‰
34.89‰
34.85‰
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
Temperature & Salinity.
VIDERØ, FAROE → NORTHWARD ON LONGITUDE 6° 35' W.
F.R.S. "SCOTIA."

Fig. 54

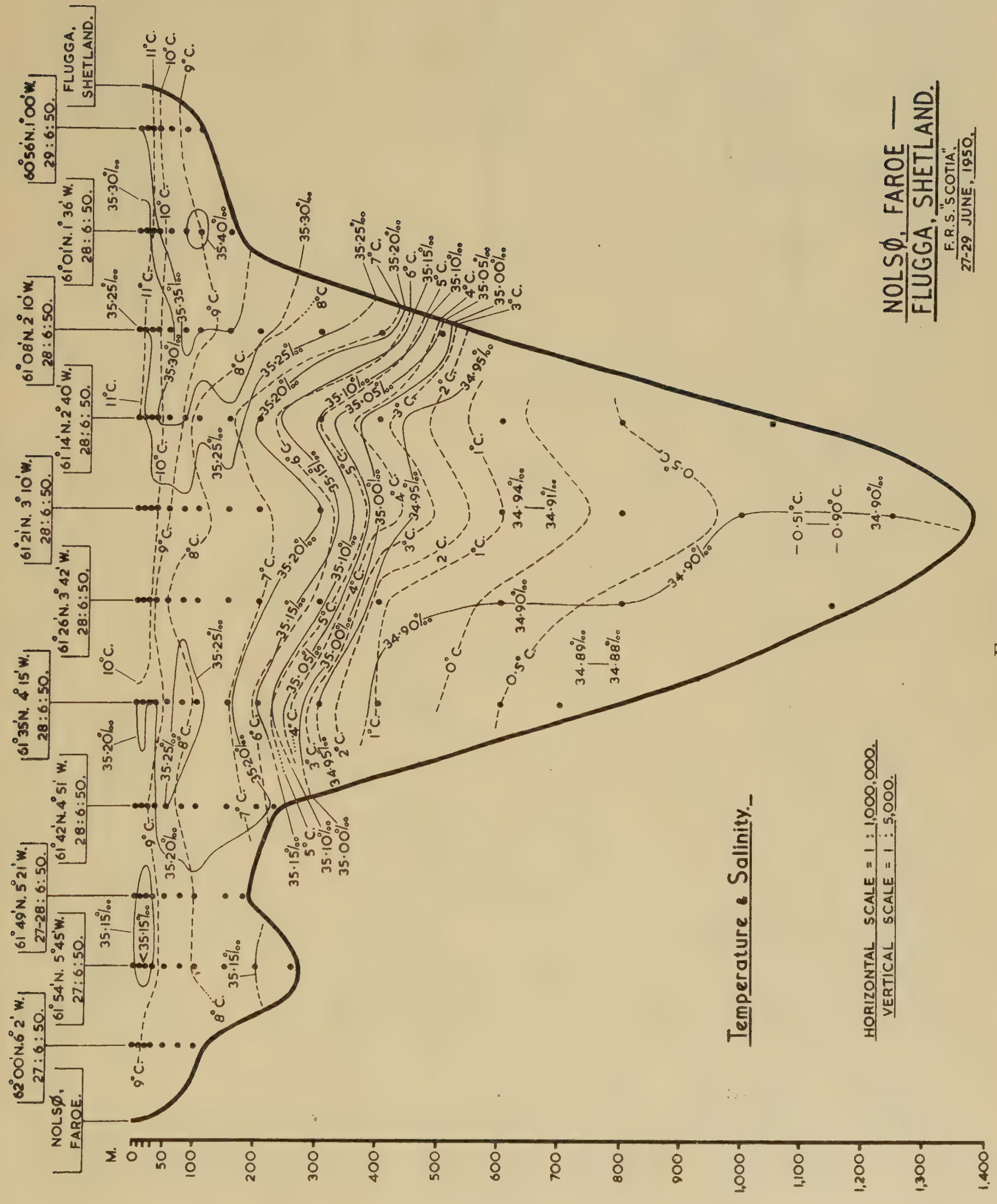

NOLSØ, FAROE — FLUGGA, SHETLAND.
F.R.S. "SCOTIA."
27-29 JUNE, 1950.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE.
62°00'N. 6°2'W. 27:6:50.
61°54'N. 5°45'W. 27:6:50.
61°49'N. 5°21'W. 27-28:6:50.
61°42'N. 4°51'W. 28:6:50.
61°35'N. 4°15'W. 28:6:50.
61°26'N. 3°42'W. 28:6:50.
61°21'N. 3°10'W. 28:6:50.
61°14'N. 2°40'W. 28:6:50.
61°08'N. 2°10'W. 28:6:50.
61°01'N. 1°36'W. 28:6:50.
60°56'N. 1°00'W. 29:6:50.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
1,400
11°C.
10°C.
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
-0.5°C.
-0.51°C.
-0.90°C.
<35.15‰
35.40‰
35.35‰
35.30‰
35.25‰
35.20‰
35.15‰
35.10‰
35.05‰
35.00‰
34.95‰
34.94‰
34.91‰
34.90‰
34.89‰
34.88‰

Fig. 55

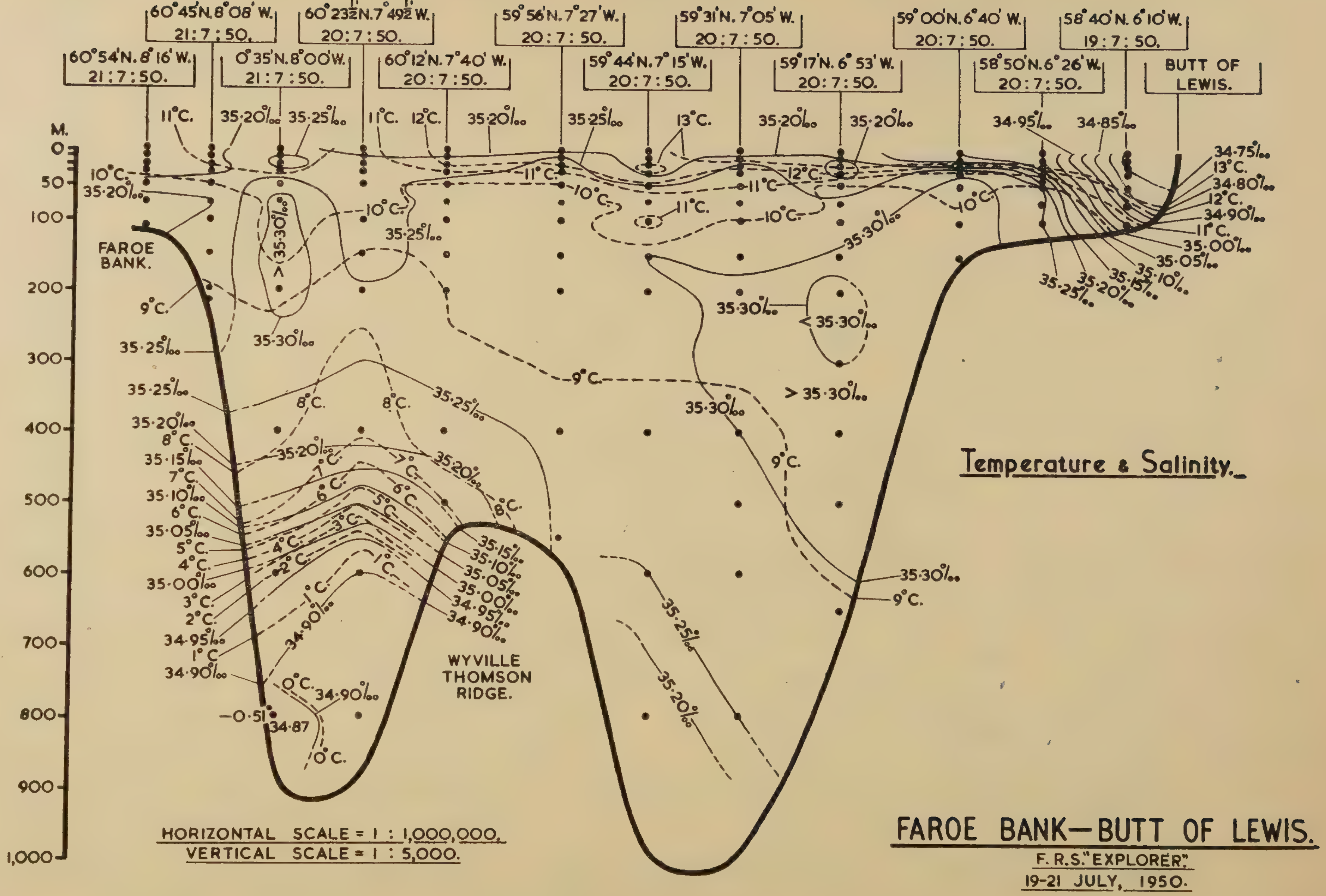
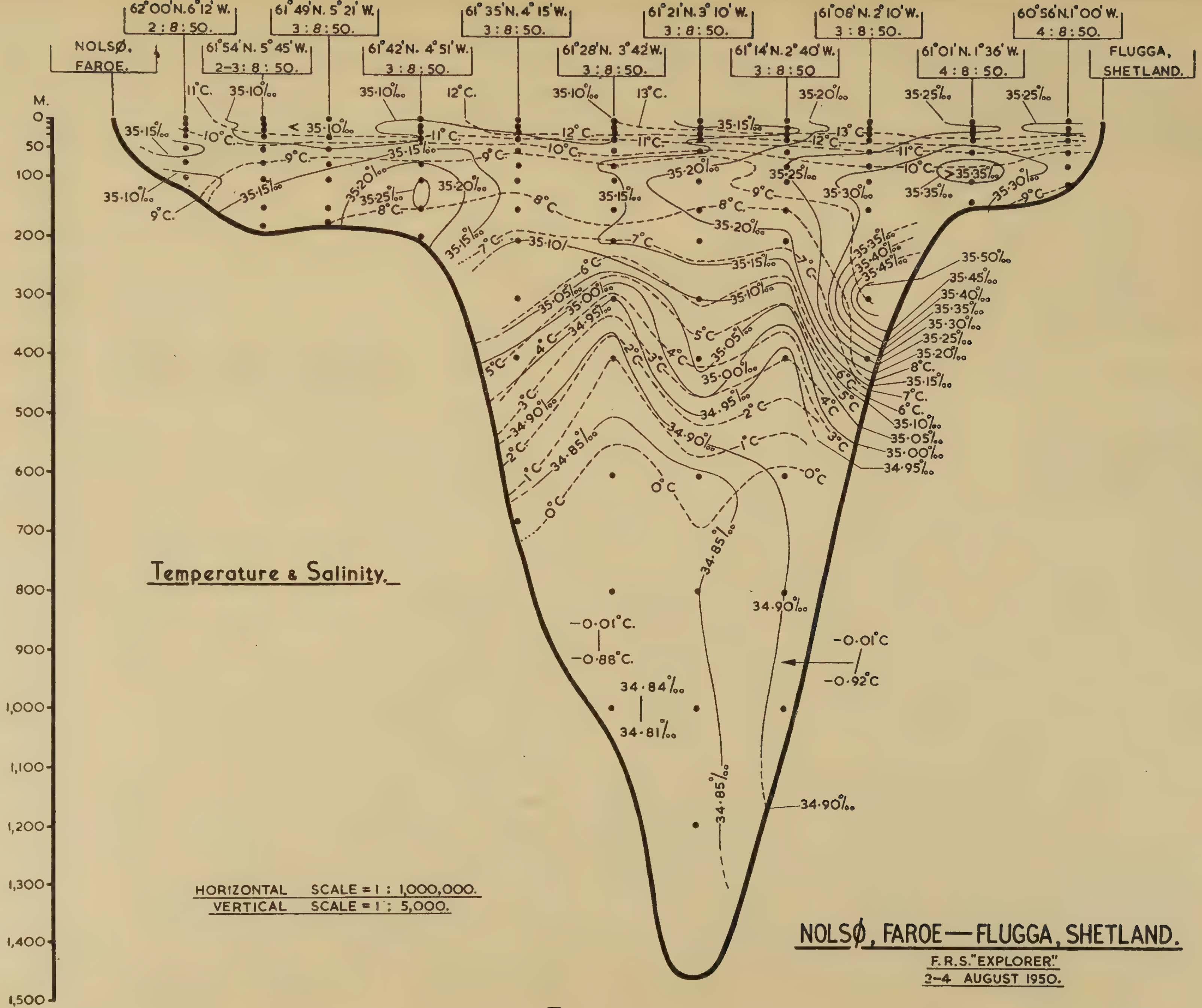

60°54'N. 8°16' W. 21:7:50.
60°45'N. 8°08' W. 21:7:50.
0°35'N. 8°00'W. 21:7:50.
60°23½'N. 7°49½' W. 20:7:50.
60°12'N. 7°40' W. 20:7:50.
59°56'N. 7°27' W. 20:7:50.
59°44'N. 7°15' W. 20:7:50.
59°31'N. 7°05' W. 20:7:50.
59°17'N. 6°53' W. 20:7:50.
59°00'N. 6°40' W. 20:7:50.
58°50'N. 6°26' W. 20:7:50.
58°40'N. 6°10' W. 19:7:50.
BUTT OF LEWIS.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
FAROE BANK.
WYVILLE THOMSON RIDGE.
Temperature & Salinity.
FAROE BANK—BUTT OF LEWIS.
F. R. S. "EXPLORER."
19-21 JULY, 1950.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
11°C.
12°C.
13°C.
10°C.
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
−0·51
34·87
34·75‰
34·80‰
34·85‰
34·90‰
34·95‰
35·00‰
35·05‰
35·10‰
35·15‰
35·20‰
35·25‰
35·30‰
> 35·30‰
< 35·30‰

Fig. 56



Temperature & Salinity.

HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.

NOLSØ, FAROE—FLUGGA, SHETLAND.

F.R.S. "EXPLORER."
2–4 AUGUST 1950.

FIG. 57

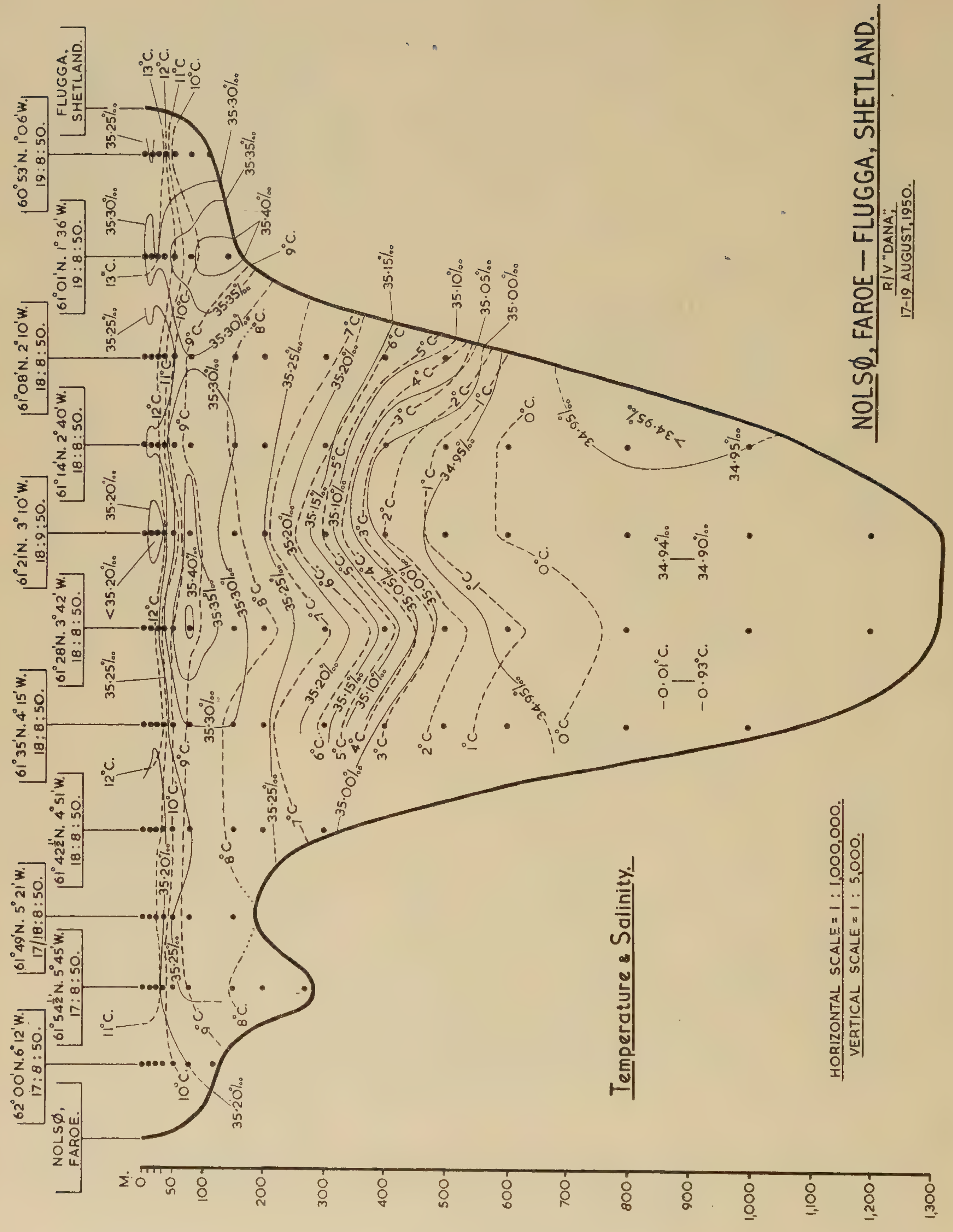

NOLSØ, FAROE—FLUGGA, SHETLAND.
R/V "DANA."
17-19 AUGUST, 1950.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE.
62°00'N. 6°12'W. 17:8:50.
61°54½'N. 5°45'W. 17:8:50.
61°49'N. 5°21'W. 17/18:8:50.
61°42½'N. 4°51'W. 18:8:50.
61°35'N. 4°15'W. 18:8:50.
61°28'N. 3°42'W. 18:8:50.
61°21'N. 3°10'W. 18:9:50.
61°14'N. 2°40'W. 18:8:50.
61°08'N. 2°10'W. 18:8:50.
61°01'N. 1°36'W. 19:8:50.
60°53'N. 1°06'W. 19:8:50.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
13°C.
12°C.
11°C.
10°C.
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
35·40‰
35·35‰
35·30‰
35·25‰
35·20‰
<35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·94‰
34·90‰
−0·01°C.
−0·93°C.

FIG. 58

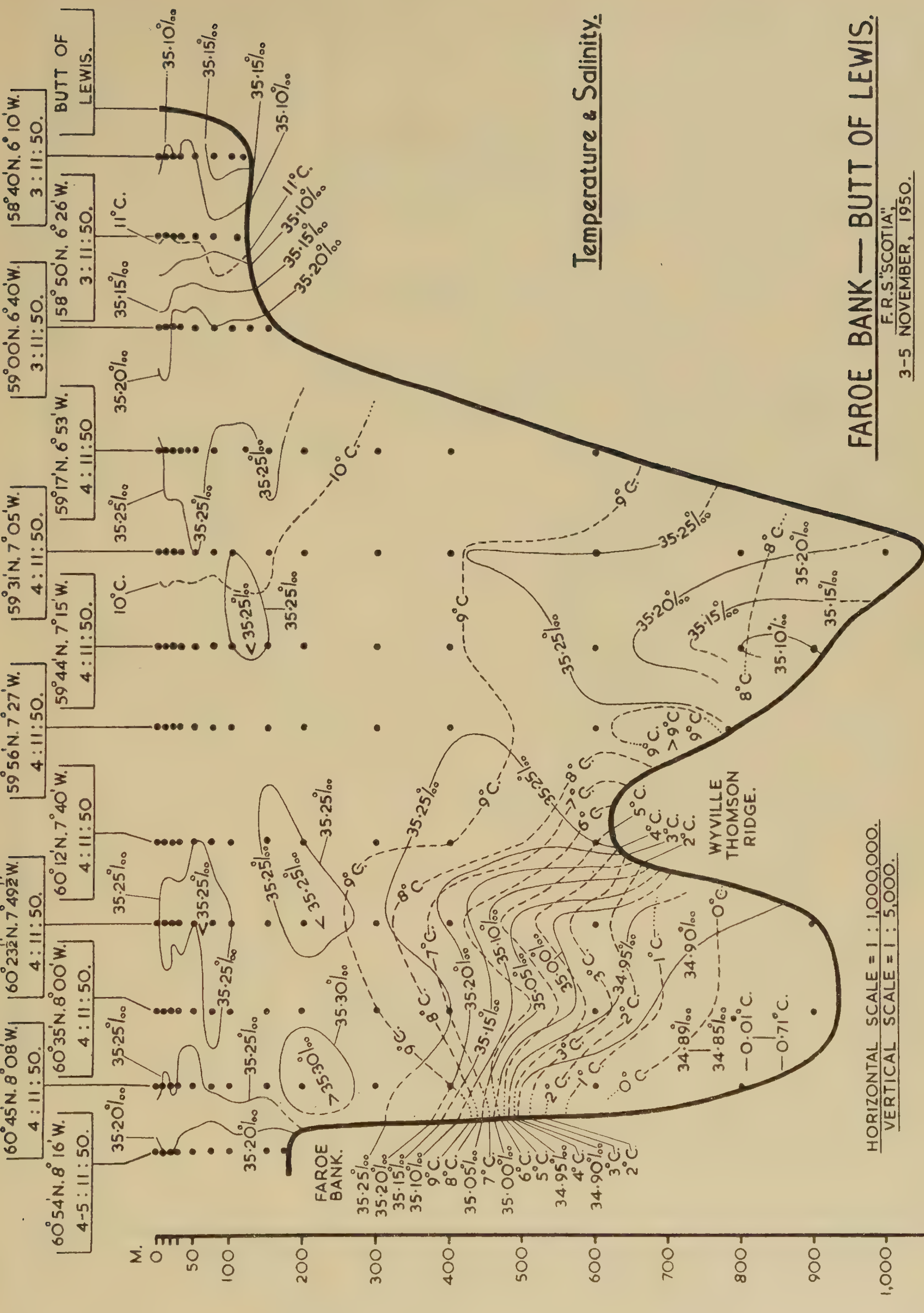
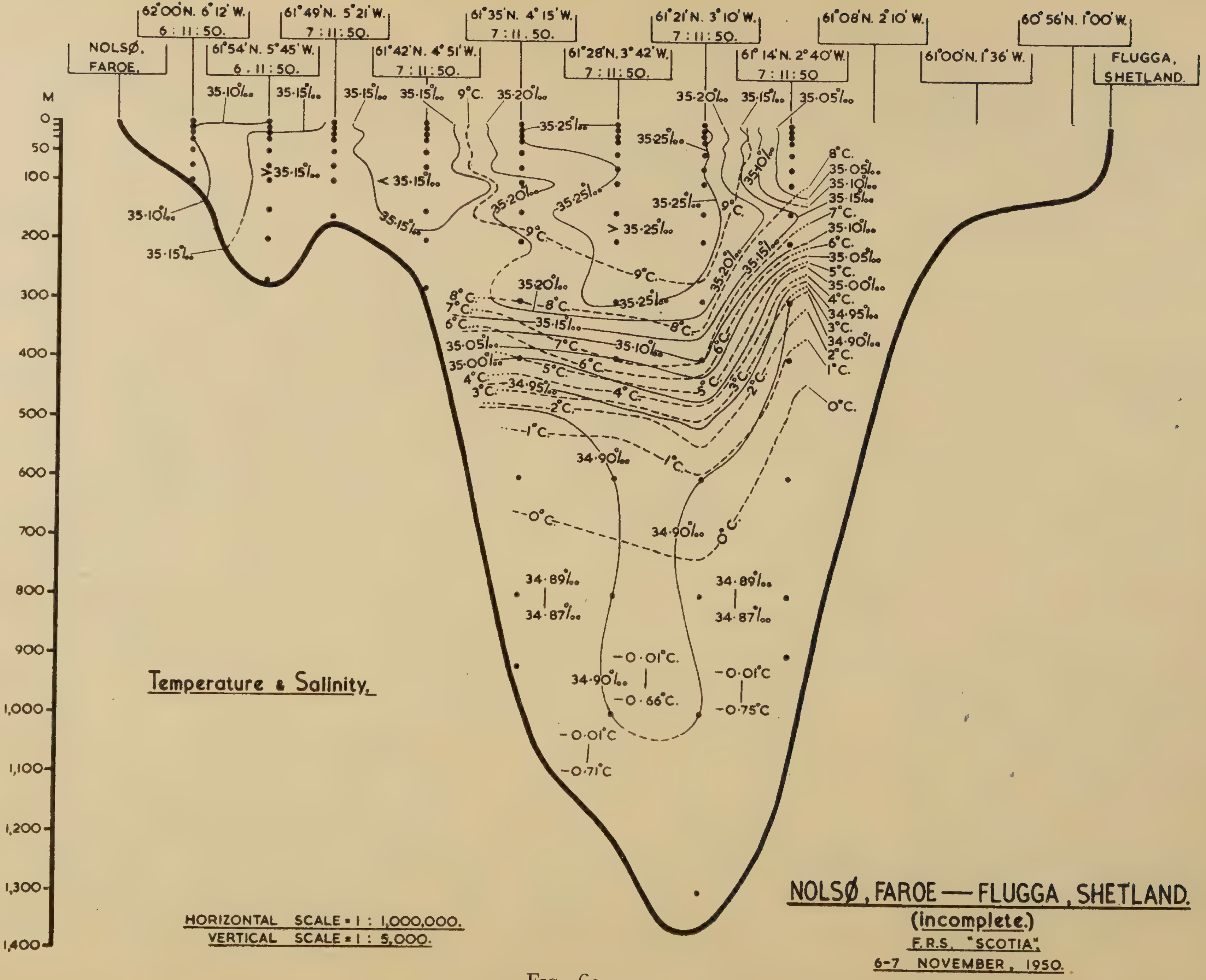

FAROE BANK — BUTT OF LEWIS.
F.R.S. "SCOTIA",
3-5 NOVEMBER, 1950.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
60°54'N. 8°16'W. 4-5 : 11 : 50.
60°45'N. 8°08'W. 4 : 11 : 50.
60°35'N. 8°00'W. 4 : 11 : 50.
60°23½'N. 7°49½'W. 4 : 11 : 50.
60°12'N. 7°40'W. 4 : 11 : 50
59°56'N. 7°27'W. 4 : 11 : 50.
59°44'N. 7°15'W. 4 : 11 : 50.
59°31'N. 7°05'W. 4 : 11 : 50.
59°17'N. 6°53'W. 4 : 11 : 50
59°00'N. 6°40'W. 3 : 11 : 50.
58°50'N. 6°26'W. 3 : 11 : 50.
58°40'N. 6°10'W. 3 : 11 : 50.
BUTT OF LEWIS.
FAROE BANK.
WYVILLE THOMSON RIDGE.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
35·10‰
35·15‰
35·20‰
35·25‰
35·30‰
35·05‰
35·00‰
34·95‰
34·90‰
34·89‰
34·85‰
11°C.
10°C.
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
>9°C.
−0·01°C.
−0·71°C.

FIG. 59



NOLSØ, FAROE — FLUGGA, SHETLAND.
(incomplete.)
F.R.S. "SCOTIA".
6-7 NOVEMBER, 1950.

Fig. 60

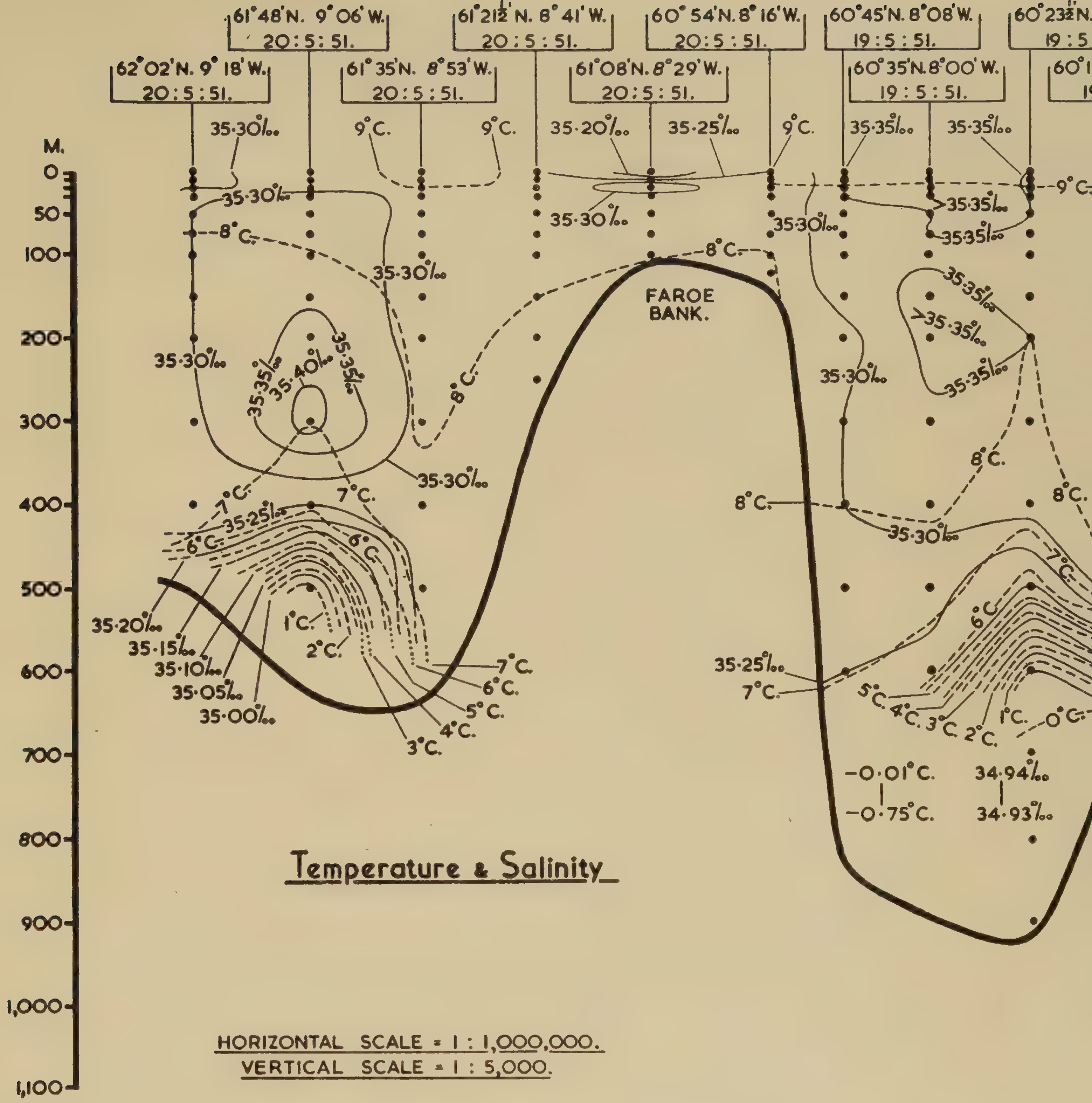
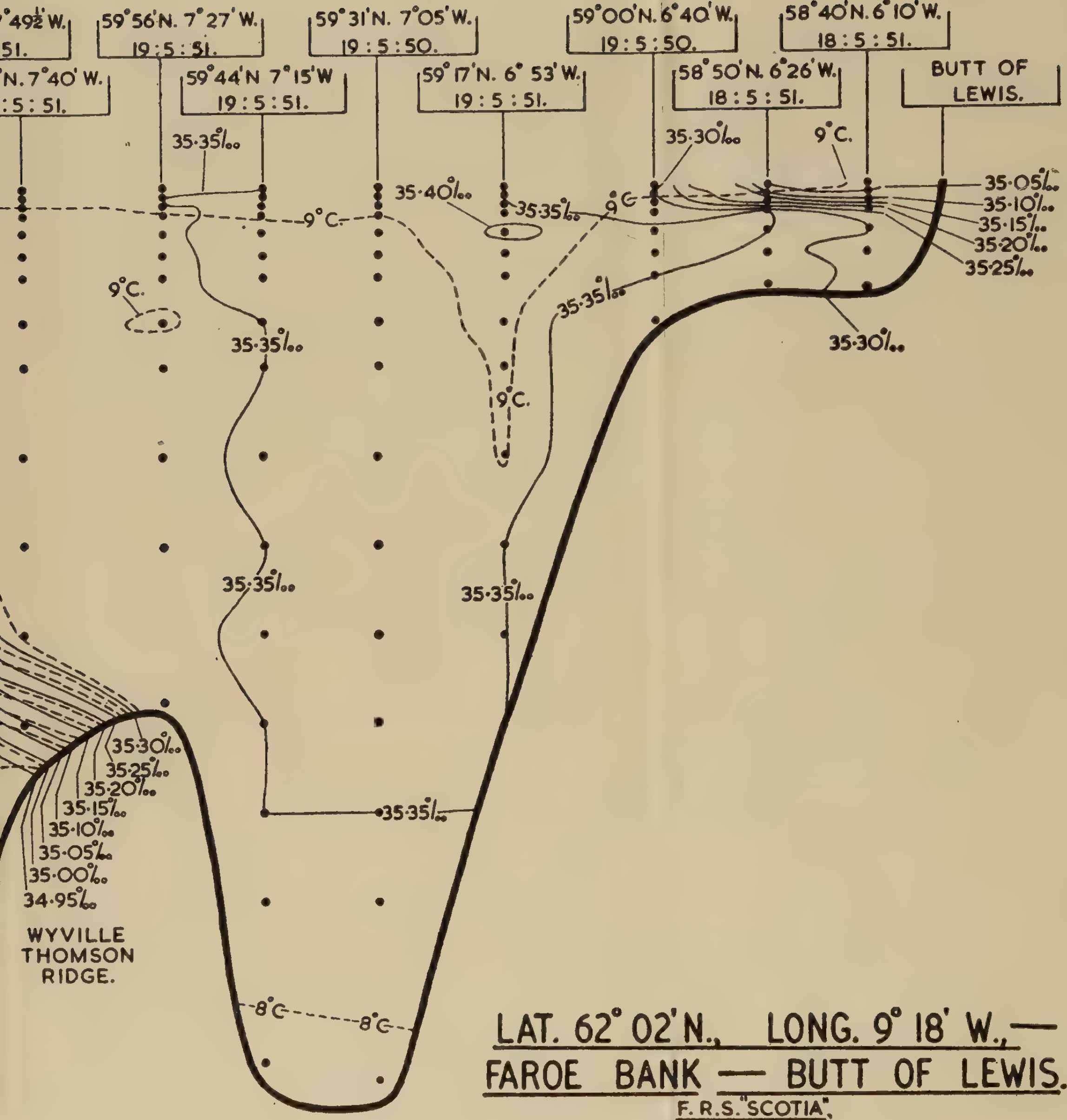

61°48'N. 9°06'W.
20:5:51.
61°21½'N. 8°41'W.
20:5:51.
60°54'N. 8°16'W.
20:5:51.
60°45'N. 8°08'W.
19:5:51.
60°23½'N.
19:5
62°02'N. 9°18'W.
20:5:51.
61°35'N. 8°53'W.
20:5:51.
61°08'N. 8°29'W.
20:5:51.
60°35'N. 8°00'W.
19:5:51.
60°1
19
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
35·30‰
9°C.
9°C.
35·20‰
35·25‰
9°C.
35·35‰
35·35‰
9°C.
35·30‰
35·30‰
8°C.
35·30‰
35·35‰
35·35‰
8°C.
35·30‰
FAROE
BANK.
35·35‰
>35·35‰
35·35‰
35·30‰
35·35‰
35·40‰
35·35‰
35·30‰
8°C.
35·30‰
8°C.
8°C.
8°C.
7°C.
7°C.
35·25‰
6°C.
6°C.
35·30‰
7°C.
6°C.
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
1°C.
2°C.
7°C.
6°C.
5°C.
4°C.
3°C.
35·25‰
7°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
−0·01°C.
−0·75°C.
34·94‰
34·93‰
Temperature & Salinity
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.

FIG. 6



LAT. 62° 02'N., LONG. 9° 18' W.,—
FAROE BANK — BUTT OF LEWIS.
F. R. S. "SCOTIA",
18–20 MAY, 1951.

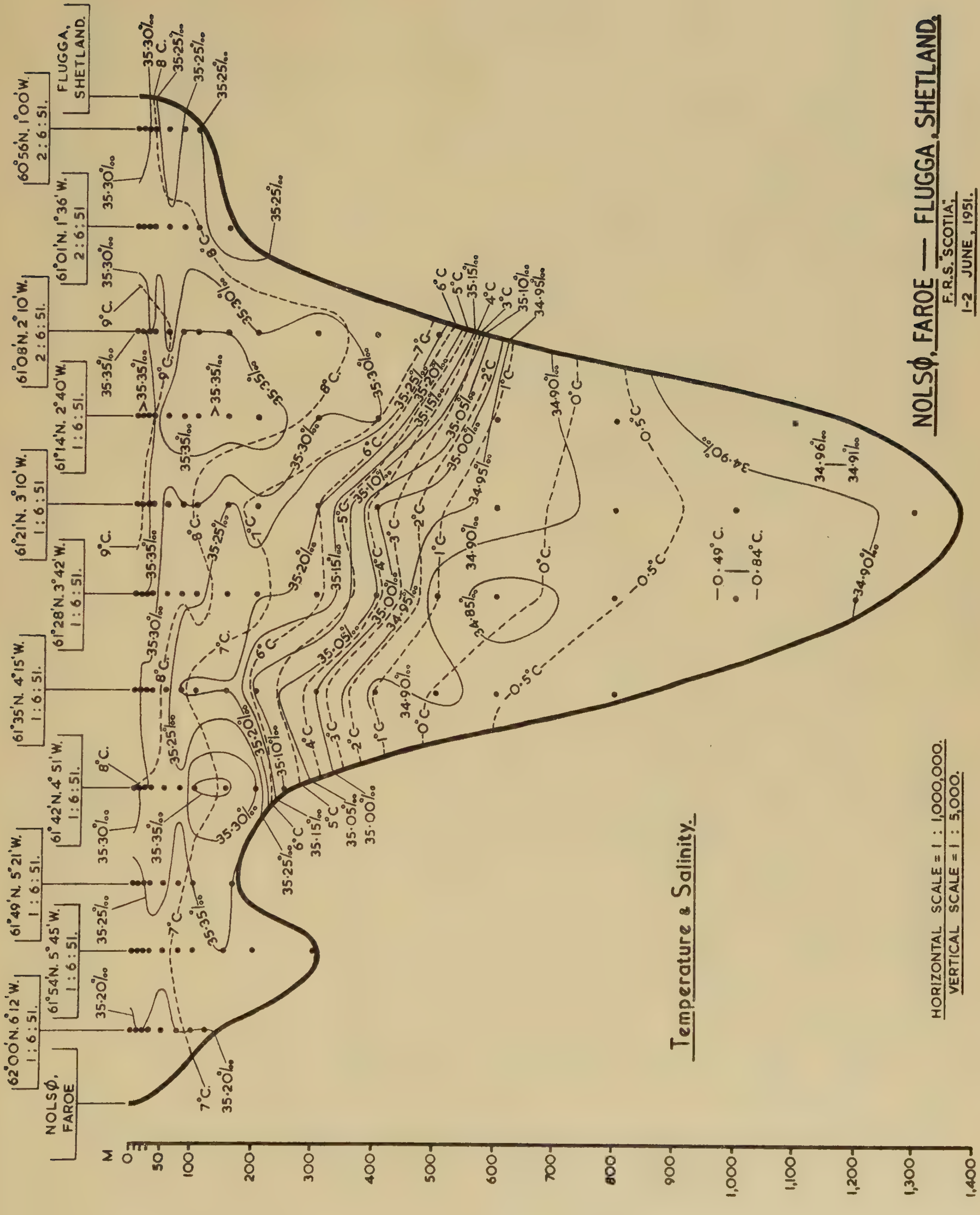

NOLSØ, FAROE — FLUGGA, SHETLAND.
F.R.S. "SCOTIA."
1-2 JUNE, 1951.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE
62°00'N. 6°12'W. 1 : 6 : 51.
61°54'N. 5°45'W. 1 : 6 : 51.
61°49'N. 5°21'W. 1 : 6 : 51.
61°42'N. 4°51'W. 1 : 6 : 51.
61°35'N. 4°15'W. 1 : 6 : 51.
61°28'N. 3°42'W. 1 : 6 : 51.
61°21'N. 3°10'W. 1 : 6 : 51
61°14'N. 2°40'W. 1 : 6 : 51.
61°08'N. 2°10'W. 2 : 6 : 51.
61°01'N. 1°36'W. 2 : 6 : 51
60°56'N. 1°00'W. 2 : 6 : 51.
FLUGGA, SHETLAND.
M
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
1,400
7°C.
35·20‰
35·25‰
35·30‰
35·35‰
8°C.
9°C.
>35·35‰
6°C
5°C
4°C
3°C
2°C
1°C
0°C
0·5°C
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·90‰
34·85‰
34·96‰
34·91‰
−0·49°C.
−0·84°C.

FIG. 62

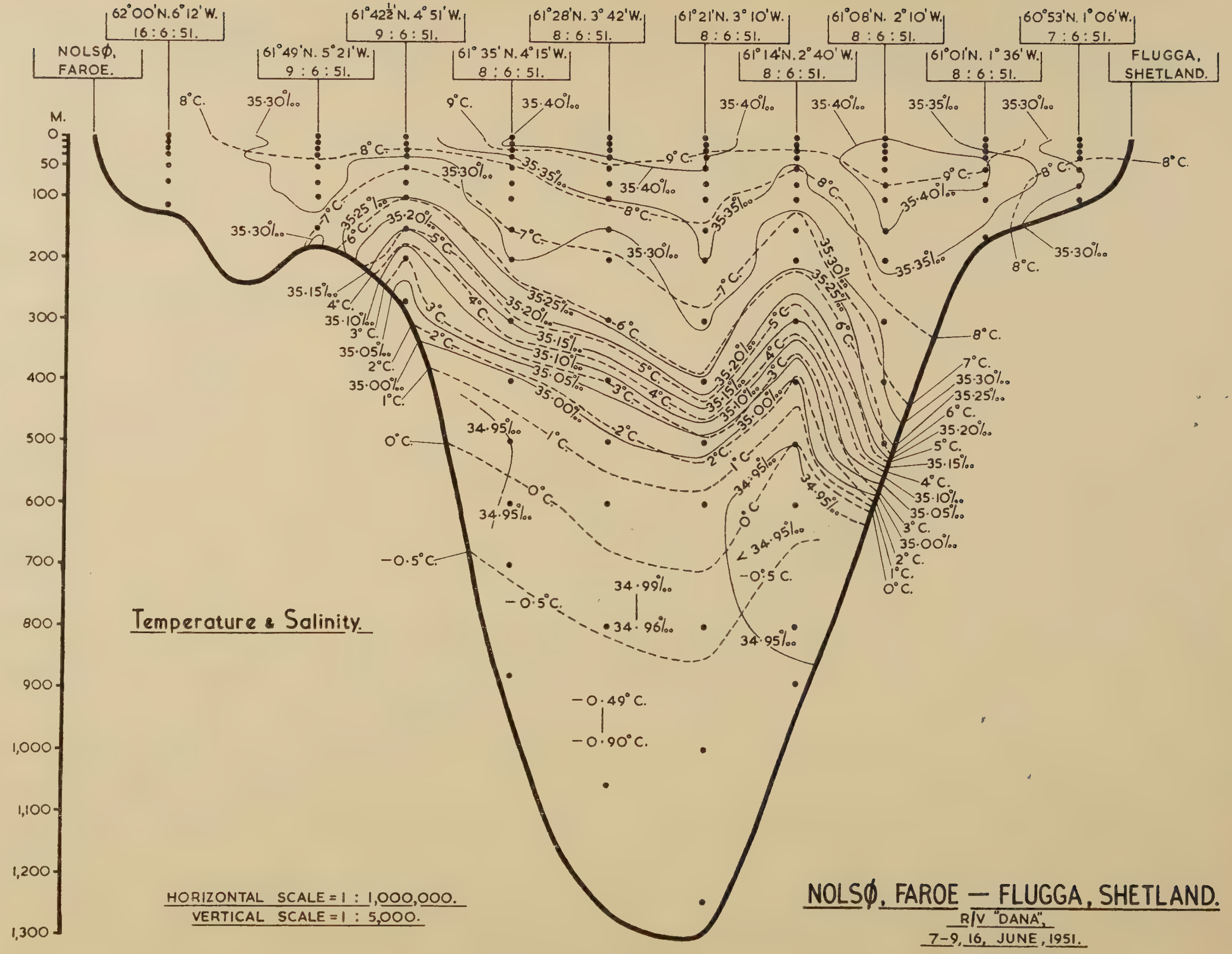

NOLSØ, FAROE.
62°00'N. 6°12'W. 16 : 6 : 51.
61°49'N. 5°21'W. 9 : 6 : 51.
61°42½'N. 4°51'W. 9 : 6 : 51.
61°35'N. 4°15'W. 8 : 6 : 51.
61°28'N. 3°42'W. 8 : 6 : 51.
61°21'N. 3°10'W. 8 : 6 : 51.
61°14'N. 2°40'W. 8 : 6 : 51.
61°08'N. 2°10'W. 8 : 6 : 51.
61°01'N. 1°36'W. 8 : 6 : 51.
60°53'N. 1°06'W. 7 : 6 : 51.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
8°C.
9°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
−0·5°C.
35·40‰
35·35‰
35·30‰
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
< 34·95‰
34·99‰
34·96‰
−0·49°C.
−0·90°C.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE — FLUGGA, SHETLAND.
R/V "DANA",
7–9, 16, JUNE, 1951.

FIG. 63

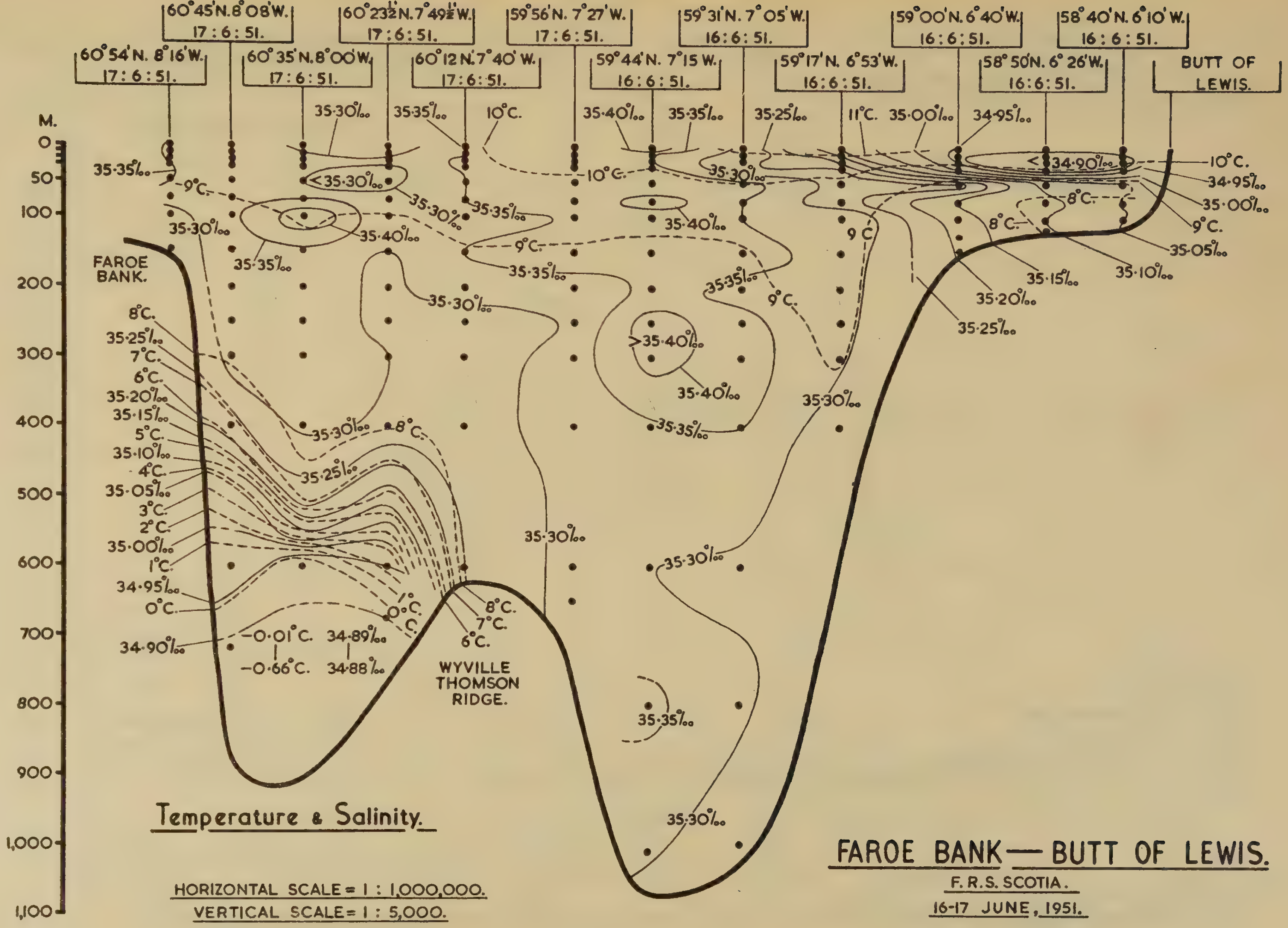

FAROE BANK — BUTT OF LEWIS.
F. R. S. SCOTIA.
16-17 JUNE, 1951.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
60°54'N. 8°16'W. 17 : 6 : 51.
60°45'N. 8°08'W. 17 : 6 : 51.
60°35'N. 8°00'W. 17 : 6 : 51.
60°23½'N. 7°49½'W. 17 : 6 : 51.
60°12'N. 7°40'W. 17 : 6 : 51.
59°56'N. 7°27'W. 17 : 6 : 51.
59°44'N. 7°15'W. 16 : 6 : 51.
59°31'N. 7°05'W. 16 : 6 : 51.
59°17'N. 6°53'W. 16 : 6 : 51.
59°00'N. 6°40'W. 16 : 6 : 51.
58°50'N. 6°26'W. 16 : 6 : 51.
58°40'N. 6°10'W. 16 : 6 : 51.
BUTT OF LEWIS.
FAROE BANK.
WYVILLE THOMSON RIDGE.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
35·35‰
9°C.
35·30‰
35·35‰
<35·30‰
35·30‰
35·40‰
35·35‰
10°C.
35·30‰
35·35‰
9°C.
35·35‰
10°C.
35·40‰
35·35‰
35·40‰
35·30‰
35·25‰
35·35‰
9°C.
>35·40‰
35·40‰
35·35‰
11°C.
35·00‰
34·95‰
<34·90‰
9 C.
8°C.
8°C.
35·30‰
10°C.
34·95‰
35·00‰
9°C.
35·05‰
35·10‰
35·15‰
35·20‰
35·25‰
8°C.
35·25‰
7°C.
6°C.
35·20‰
35·15‰
5°C.
35·10‰
4°C.
35·05‰
3°C.
2°C.
35·00‰
1°C.
34·95‰
0°C.
34·90‰
35·30‰
8°C.
35·25‰
1°C.
0°C.
-0·01°C.
-0·66°C.
34·89‰
34·88‰
8°C.
7°C.
6°C.
35·30‰
35·30‰
35·35‰
35·30‰

FIG. 64

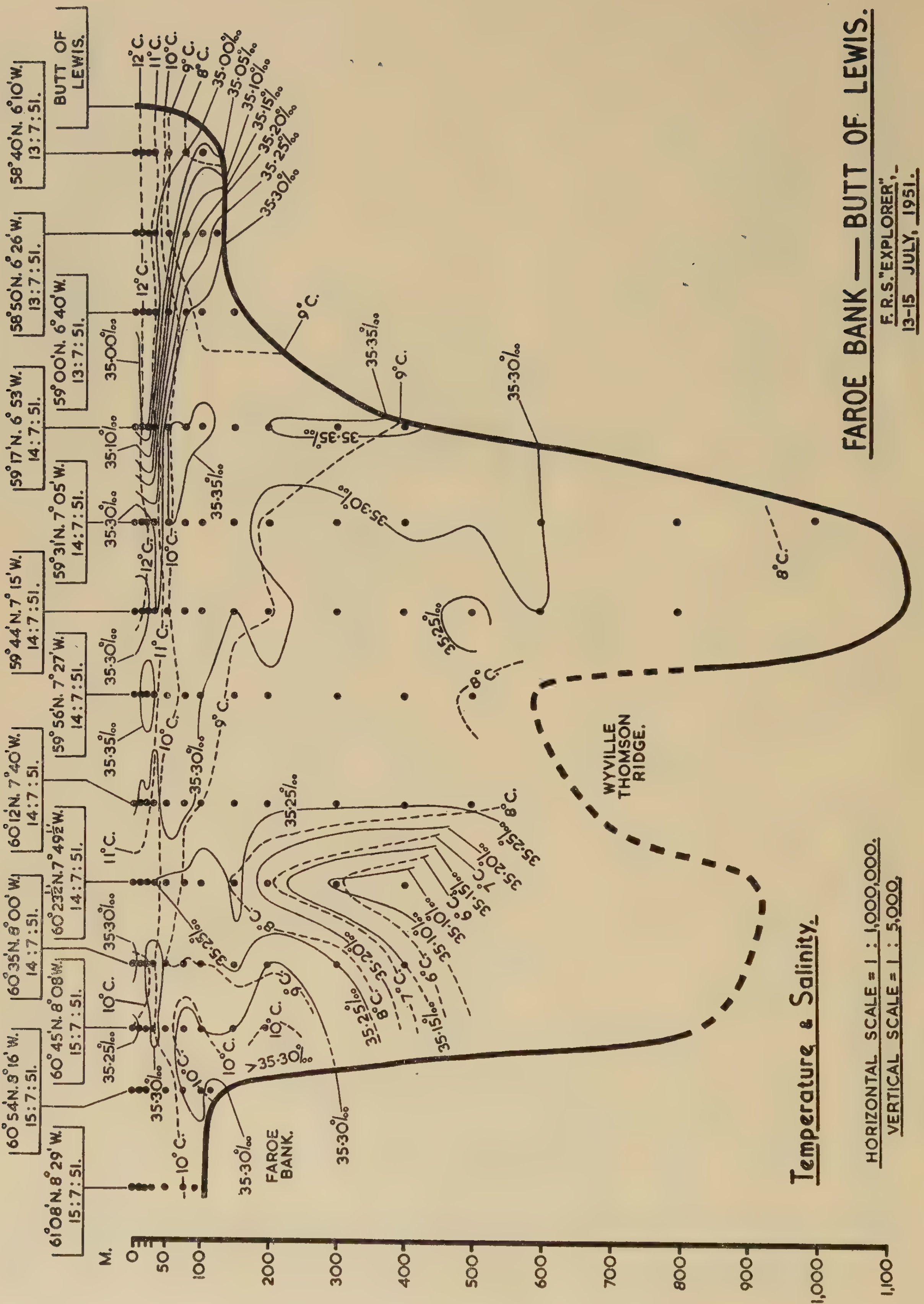

FAROE BANK —— BUTT OF LEWIS.
F.R.S. "EXPLORER",
13-15 JULY, 1951.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
61°08'N. 8°29'W. 15:7:51.
60°54'N. 8°16'W. 15:7:51.
60°45'N. 8°08'W. 15:7:51.
60°35'N. 8°00'W. 14:7:51.
60°23½'N. 7°49½'W. 14:7:51.
60°12'N. 7°40'W. 14:7:51.
59°56'N. 7°27'W. 14:7:51.
59°44'N. 7°15'W. 14:7:51.
59°31'N. 7°05'W. 14:7:51.
59°17'N. 6°53'W. 14:7:51.
59°00'N. 6°40'W. 13:7:51.
58°50'N. 6°26'W. 13:7:51.
58°40'N. 6°10'W. 13:7:51.
BUTT OF LEWIS.
FAROE BANK.
WYVILLE THOMSON RIDGE.
12°C.
11°C.
10°C.
9°C.
8°C.
7°C.
6°C.
35·00‰
35·05‰
35·10‰
35·15‰
35·20‰
35·25‰
35·30‰
35·35‰
>35·30‰
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100

FIG. 65

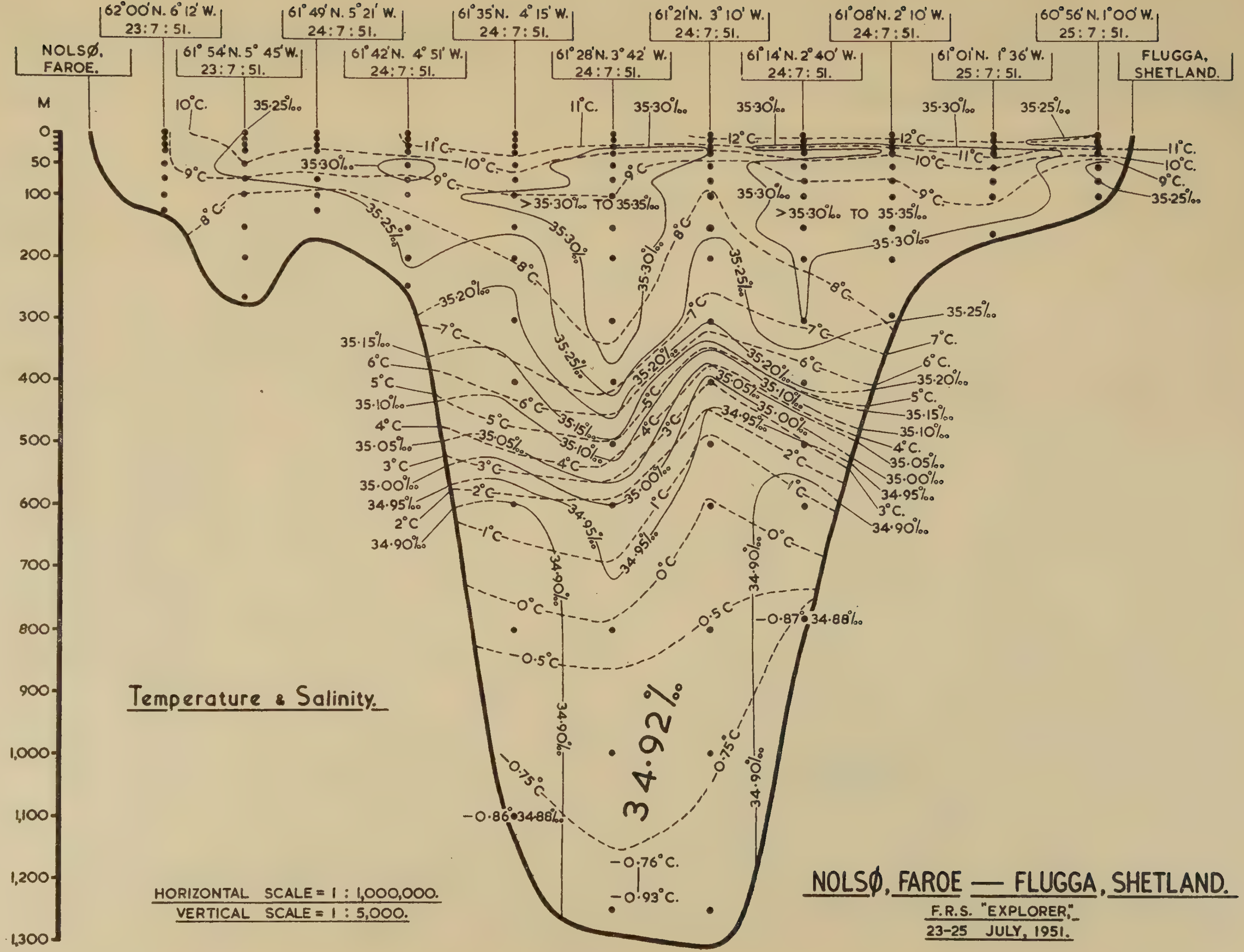

NOLSØ, FAROE.
62°00'N. 6°12' W. 23:7:51.
61° 54'N. 5° 45'W. 23:7:51.
61° 49'N. 5°21' W. 24:7:51.
61° 42'N. 4° 51' W. 24:7:51.
61°35'N. 4°15' W. 24:7:51.
61°28'N. 3°42' W. 24:7:51.
61°21'N. 3°10' W. 24:7:51.
61°14'N. 2°40' W. 24:7:51.
61°08'N. 2°10' W. 24:7:51.
61°01'N. 1°36' W. 25:7:51.
60°56'N. 1°00' W. 25:7:51.
FLUGGA, SHETLAND.
M
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
12°C.
11°C.
10°C.
9°C.
8°C.
7°C.
6°C.
5°C.
4°C.
3°C.
2°C.
1°C.
0°C.
0.5°C.
0.75°C.
35·25‰
35·30‰
>35·30‰ TO 35·35‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·90‰
−0·87° 34·88‰
−0·86° 34·88‰
34·92‰
−0·76°C.
−0·93°C.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE — FLUGGA, SHETLAND.
F.R.S. "EXPLORER,"
23–25 JULY, 1951.

FIG. 66

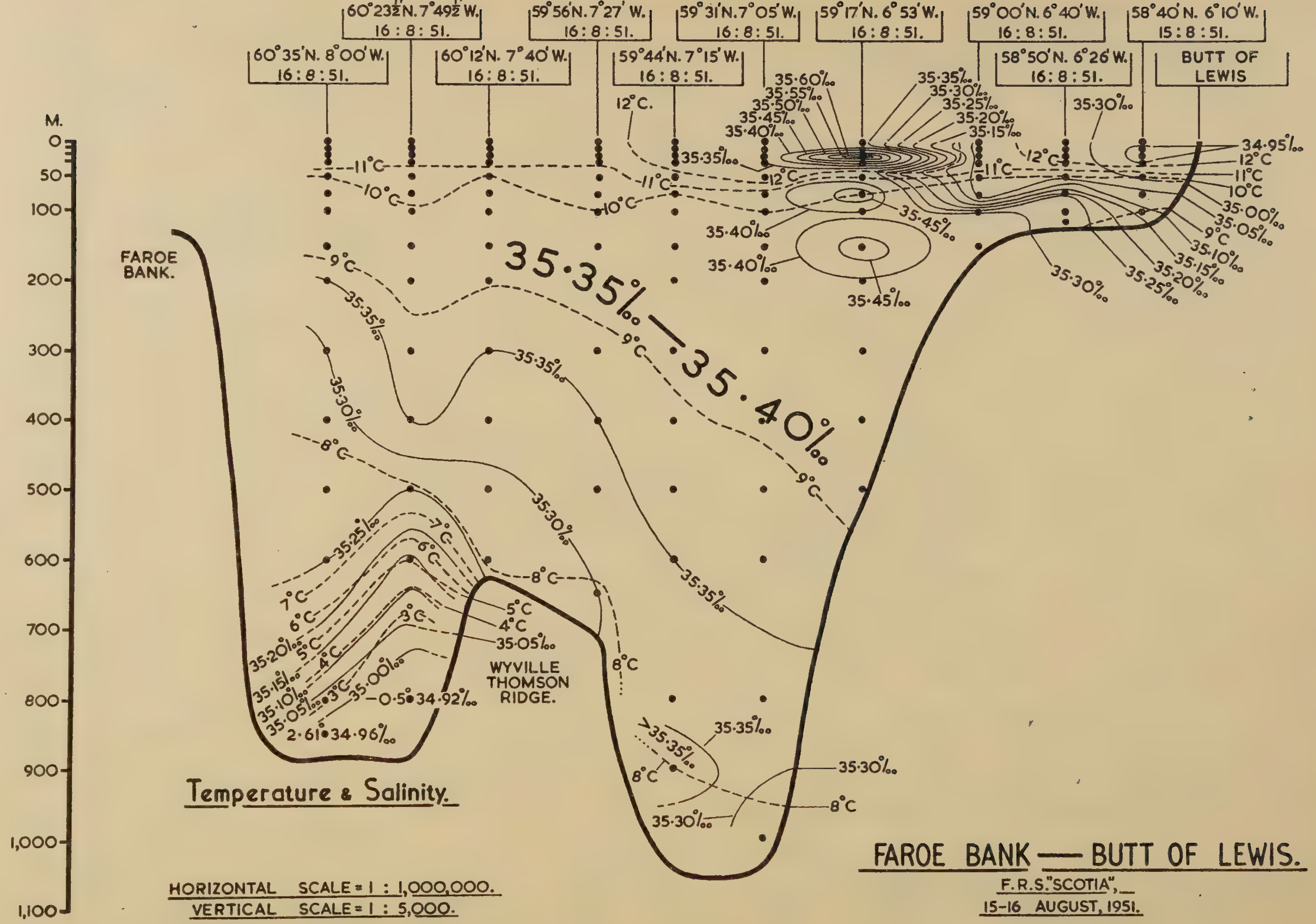
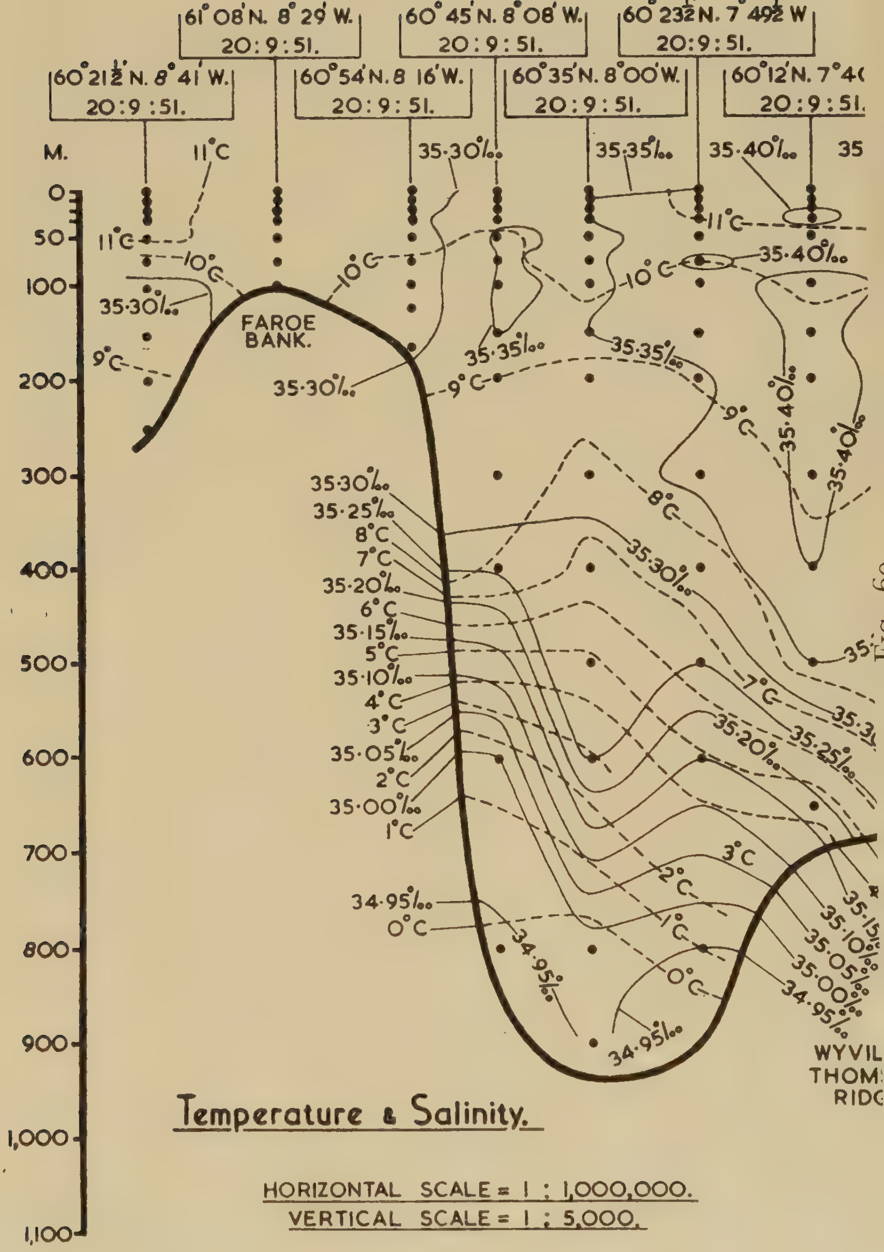

FAROE BANK — BUTT OF LEWIS.
F.R.S. "SCOTIA",
15-16 AUGUST, 1951.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
60°35′N. 8°00′W. 16 : 8 : 51.
60°23½′N. 7°49½′W. 16 : 8 : 51.
60°12′N. 7°40′W. 16 : 8 : 51.
59°56′N. 7°27′W. 16 : 8 : 51.
59°44′N. 7°15′W. 16 : 8 : 51.
59°31′N. 7°05′W. 16 : 8 : 51.
59°17′N. 6°53′W. 16 : 8 : 51.
59°00′N. 6°40′W. 16 : 8 : 51.
58°50′N. 6°26′W. 16 : 8 : 51.
58°40′N. 6°10′W. 15 : 8 : 51.
BUTT OF LEWIS
FAROE BANK.
WYVILLE THOMSON RIDGE.
35·35‰ — 35·40‰
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
11°C
10°C
9°C
8°C
7°C
6°C
5°C
4°C
3°C
12°C
34·95‰
35·00‰
35·05‰
35·10‰
35·15‰
35·20‰
35·25‰
35·30‰
35·35‰
35·40‰
35·45‰
35·50‰
35·55‰
35·60‰
>35·35‰
−0·5 34·92‰
2·61 34·96‰

Fig. 67



Temperature & Salinity.

HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.

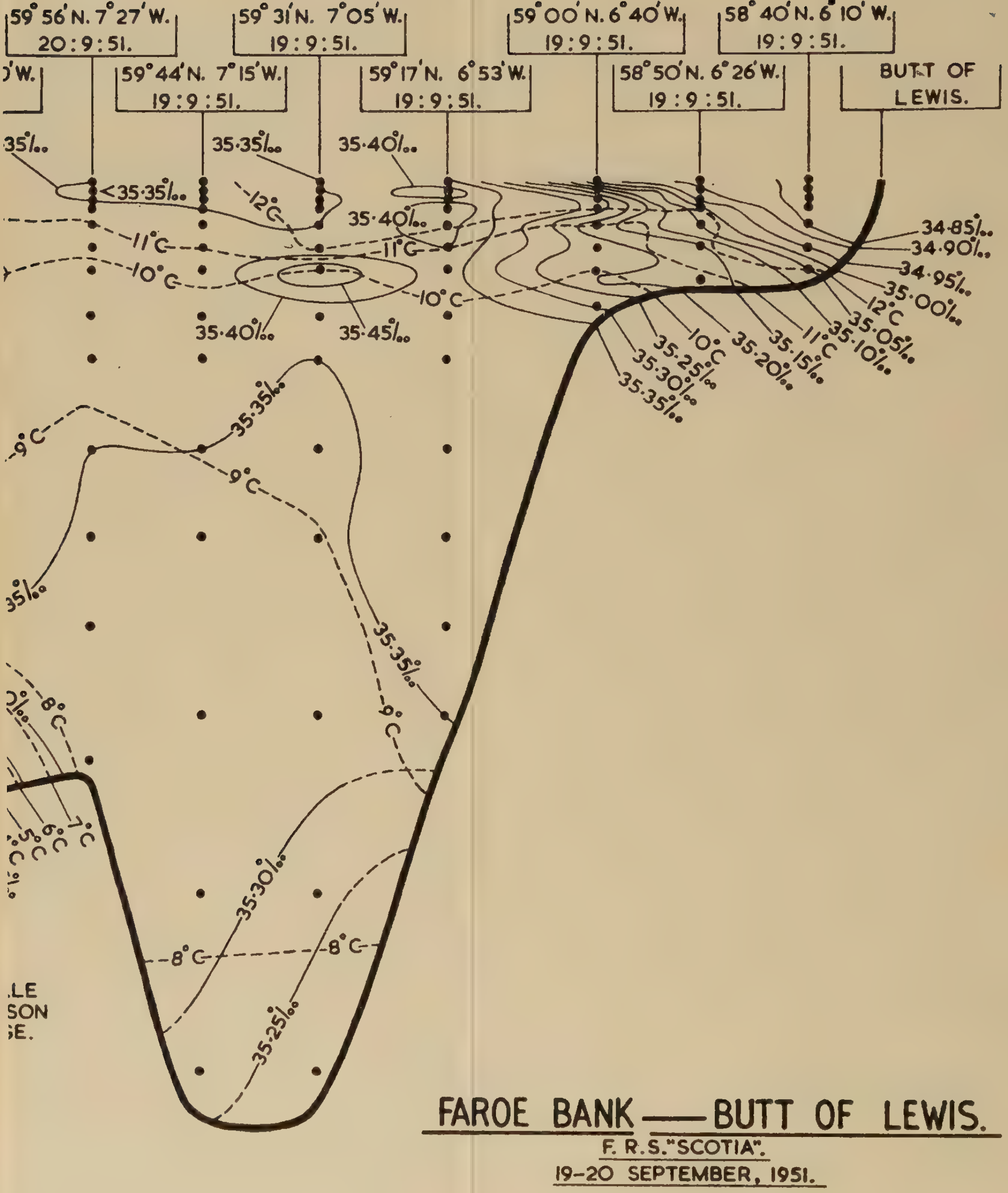

59° 56′ N. 7° 27′ W.
20 : 9 : 51.
59° 44′ N. 7° 15′ W.
19 : 9 : 51.
59° 31′ N. 7° 05′ W.
19 : 9 : 51.
59° 17′ N. 6° 53′ W.
19 : 9 : 51.
59° 00′ N. 6° 40′ W.
19 : 9 : 51.
58° 50′ N. 6° 26′ W.
19 : 9 : 51.
58° 40′ N. 6° 10′ W.
19 : 9 : 51.
BUTT OF LEWIS.
35‰
<35·35‰
35·35‰
12°C
35·40‰
35·40‰
11°C
11°C
10°C
10°C
35·40‰
35·45‰
34·85‰
34·90‰
34·95‰
35·00‰
12°C
35·05‰
35·10‰
11°C
35·15‰
35·20‰
10°C
35·25‰
35·30‰
35·35‰
9°C
35·35‰
9°C
35‰
35·35‰
9°C
8°C
7°C
6°C
5°C
35·30‰
8°C
8°C
35·25‰
LE
SON
E.
FAROE BANK —— BUTT OF LEWIS.
F. R.S. "SCOTIA".
19–20 SEPTEMBER, 1951.

FIG. 68

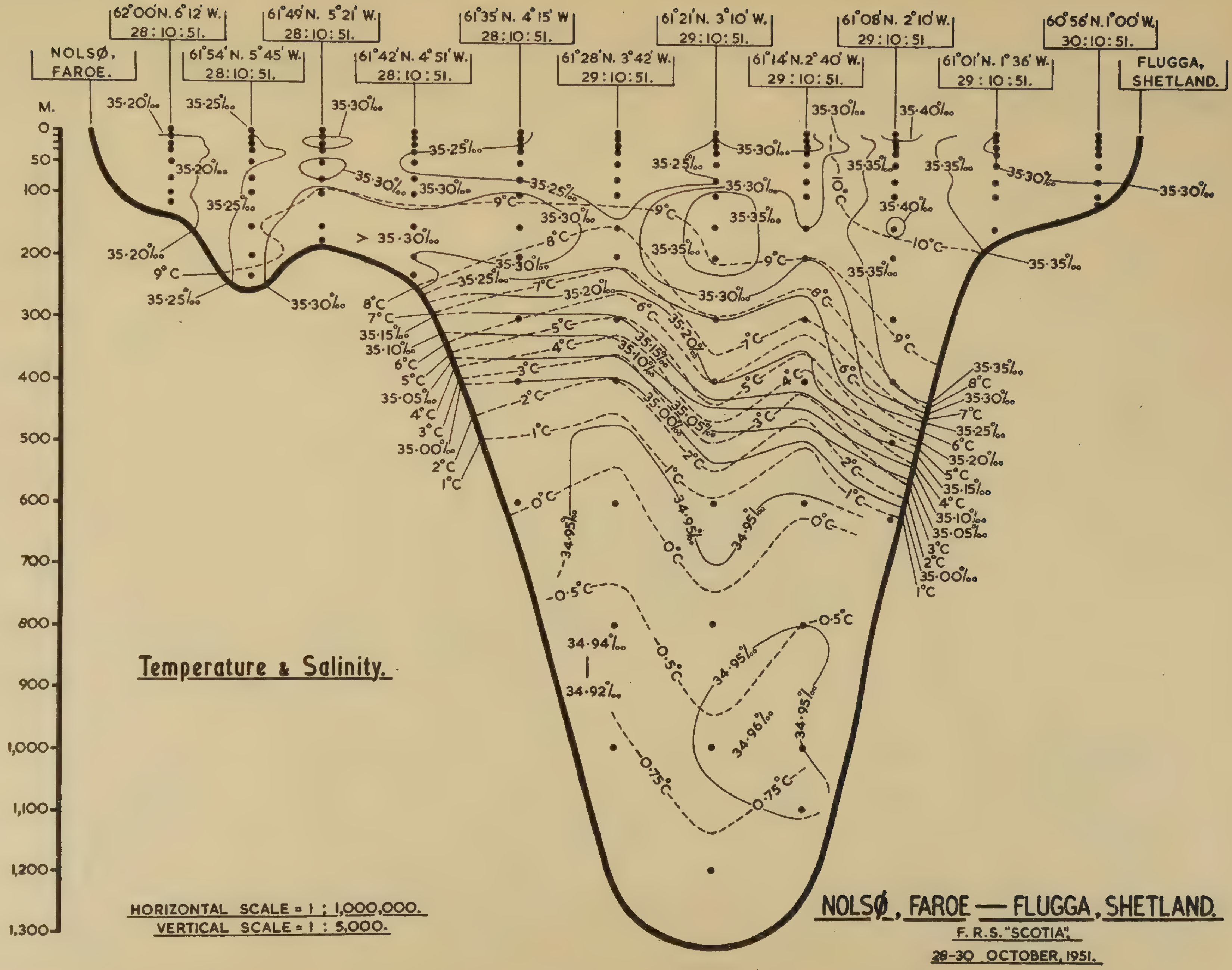

NOLSØ, FAROE.
62°00'N. 6°12' W. 28:10:51.
61°54' N. 5°45' W. 28:10:51.
61°49' N. 5°21' W. 28:10:51.
61°42' N. 4°51' W. 28:10:51.
61°35' N. 4°15' W 28:10:51.
61°28' N. 3°42' W. 29:10:51.
61°21' N. 3°10' W. 29:10:51.
61°14' N. 2°40' W. 29:10:51.
61°08' N. 2°10' W. 29:10:51
61°01' N. 1°36' W. 29:10:51.
60°56' N. 1°00' W. 30:10:51.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
35·20‰
35·25‰
35·30‰
35·35‰
35·40‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·96‰
34·94‰
34·92‰
> 35·30‰
10°C
9°C
8°C
7°C
6°C
5°C
4°C
3°C
2°C
1°C
0°C
-0·5°C
-0·75°C
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE — FLUGGA, SHETLAND.
F. R. S. "SCOTIA".
28-30 OCTOBER, 1951.

FIG. 69

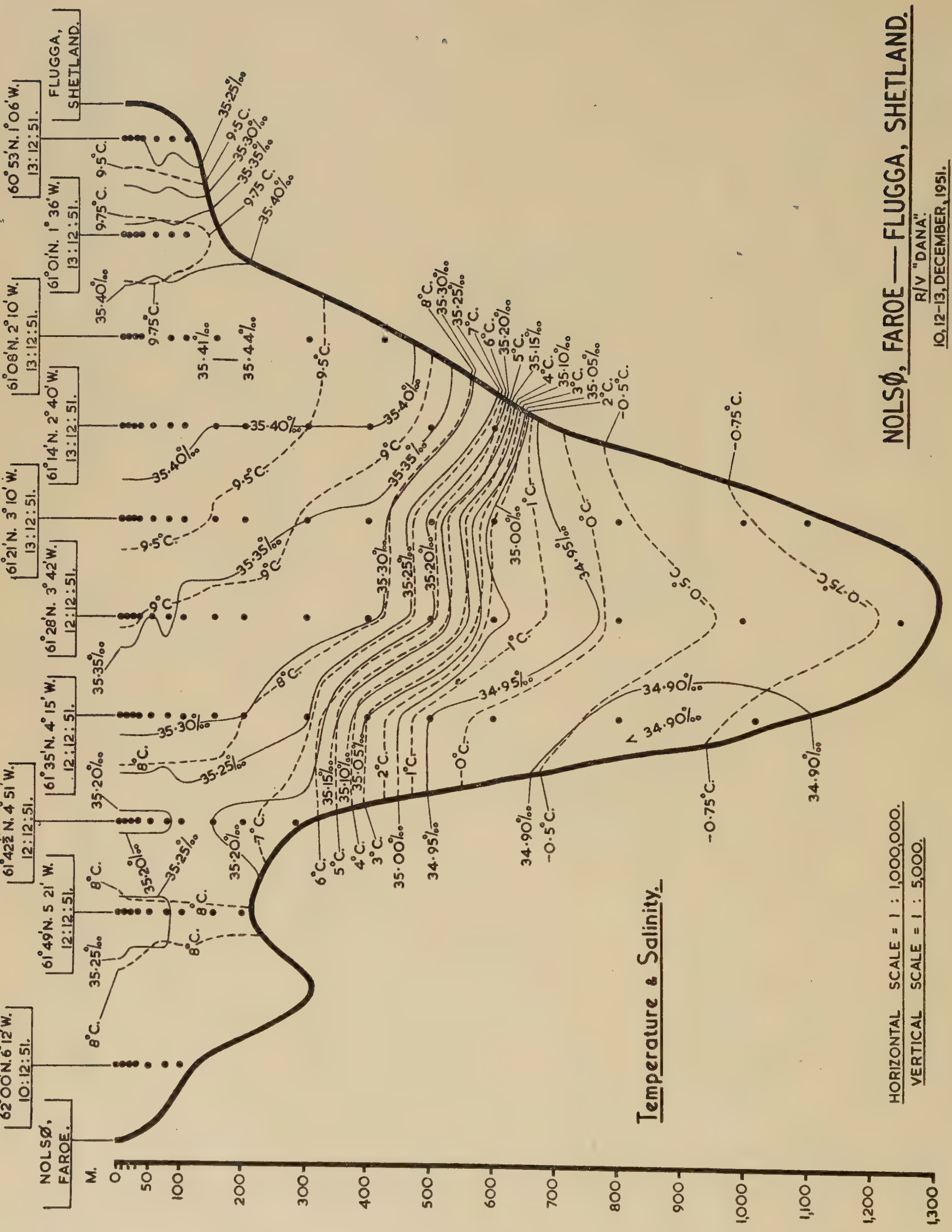
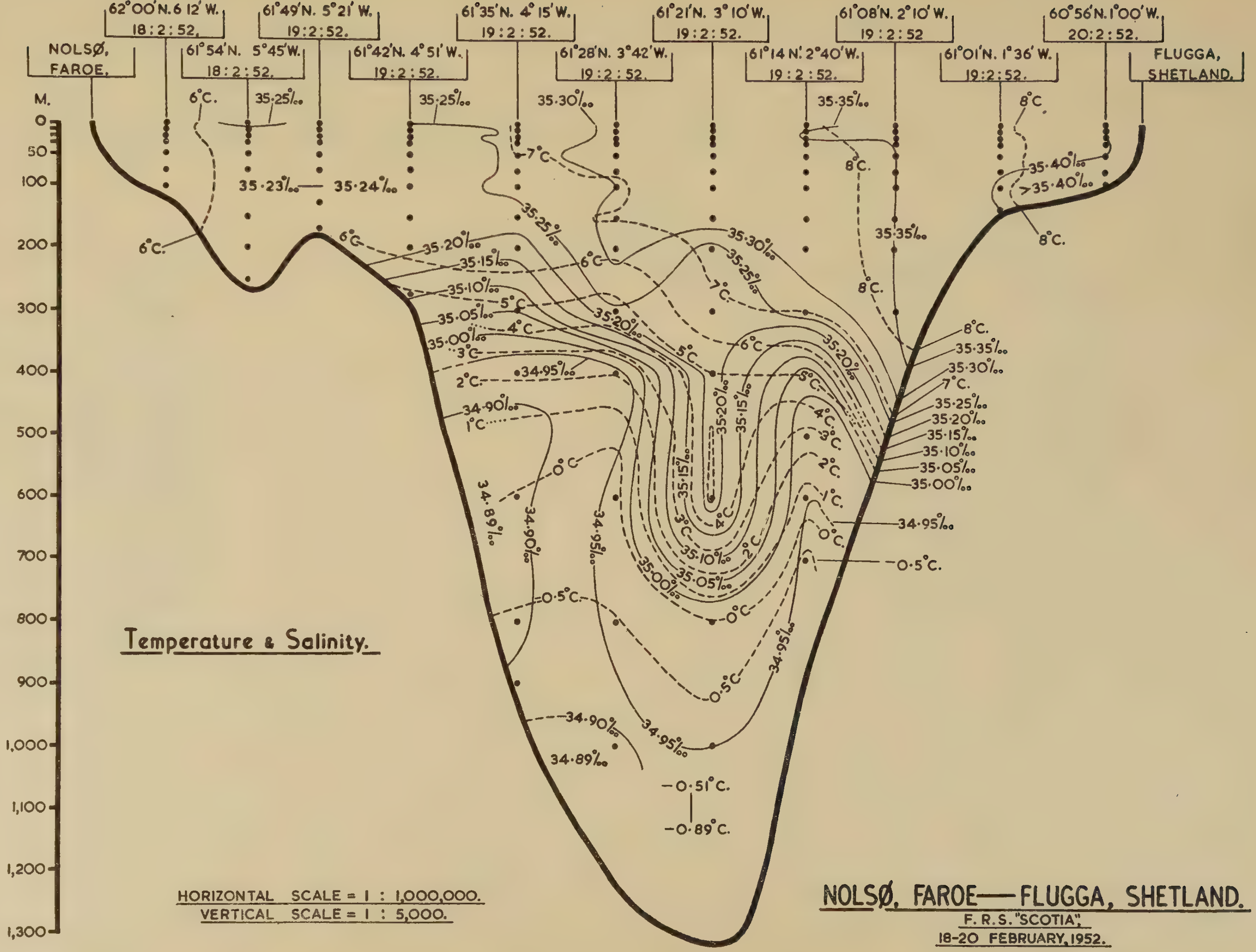

NOLSØ, FAROE—FLUGGA, SHETLAND.
R/V "DANA".
10, 12–13, DECEMBER, 1951.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE.
62°00'N. 6°12'W. 10:12:51.
61°49'N. 5 21' W. 12:12:51.
61°42½'N. 4°51'W. 12:12:51.
61°35'N. 4°15'W. 12:12:51.
61°28'N. 3°42'W. 12:12:51.
61°21'N. 3°10'W. 13:12:51.
61°14'N. 2°40'W. 13:12:51.
61°08'N. 2°10'W. 13:12:51.
61°01'N. 1°36'W. 13:12:51.
60°53'N. 1°06'W. 13:12:51.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
8°C.
35·25‰
35·20‰
35·25‰
7°C.
6°C.
5°C.
4°C.
3°C.
35·00‰
34·95‰
34·90‰
-0·5°C.
-0·75°C.
34·90‰
35·35‰
35·30‰
35·15‰
35·10‰
35·05‰
2°C.
1°C.
0°C.
35·30‰
35·25‰
35·20‰
34·95‰
34·90‰
< 34·90‰
9°C.
9·5°C.
35·35‰
35·40‰
35·41‰
35·44‰
9·75°C.
35·25‰
9·5°C.
35·30‰
35·35‰
9·75°C.
35·40‰
35·20‰
35·15‰
35·10‰
35·05‰
-0·5°C.
-0·75°C.

FIG. 70



Temperature & Salinity.

HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.

NOLSØ, FAROE—FLUGGA, SHETLAND.
F. R. S. "SCOTIA".
18-20 FEBRUARY, 1952.

Fig. 71

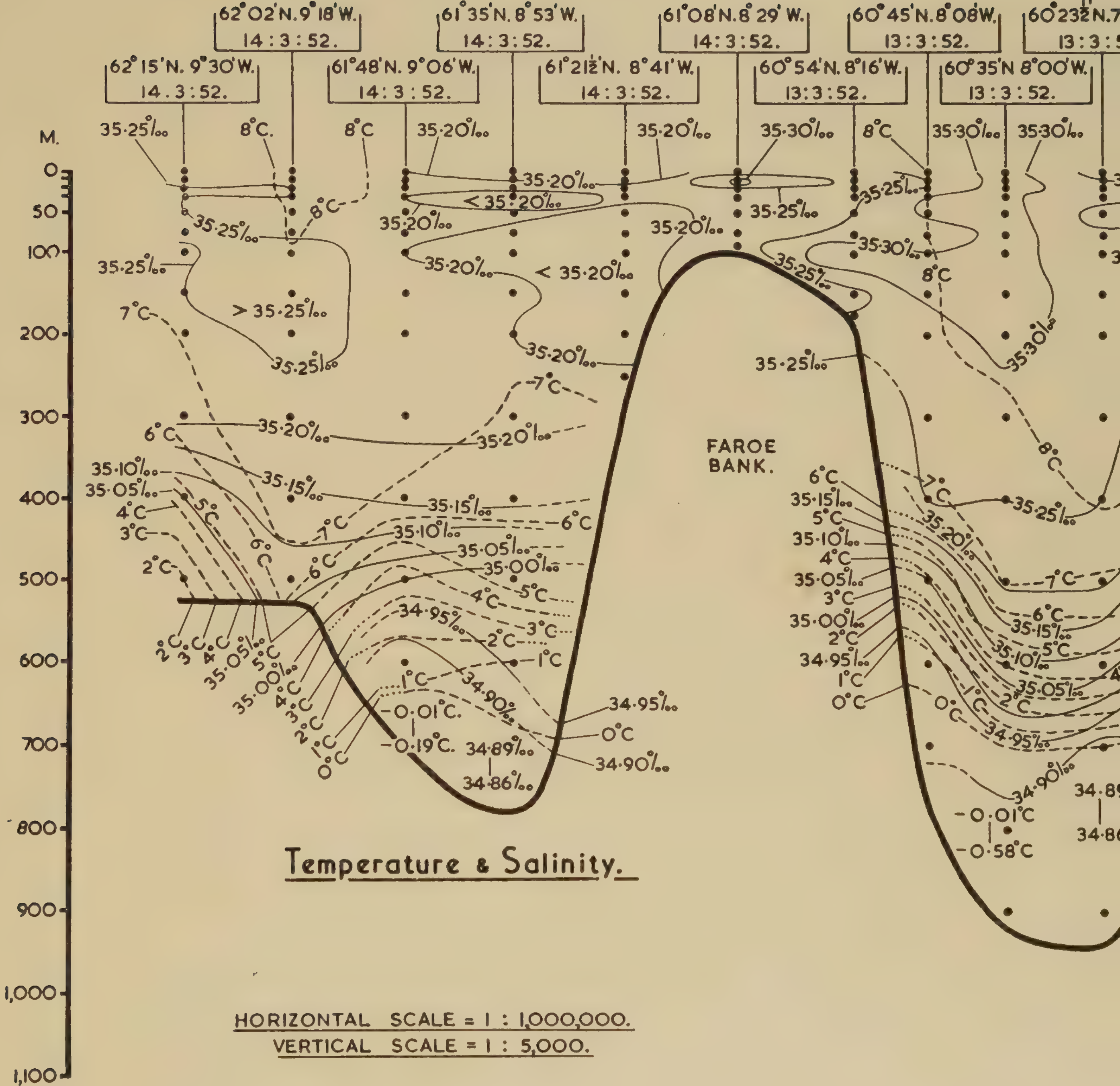
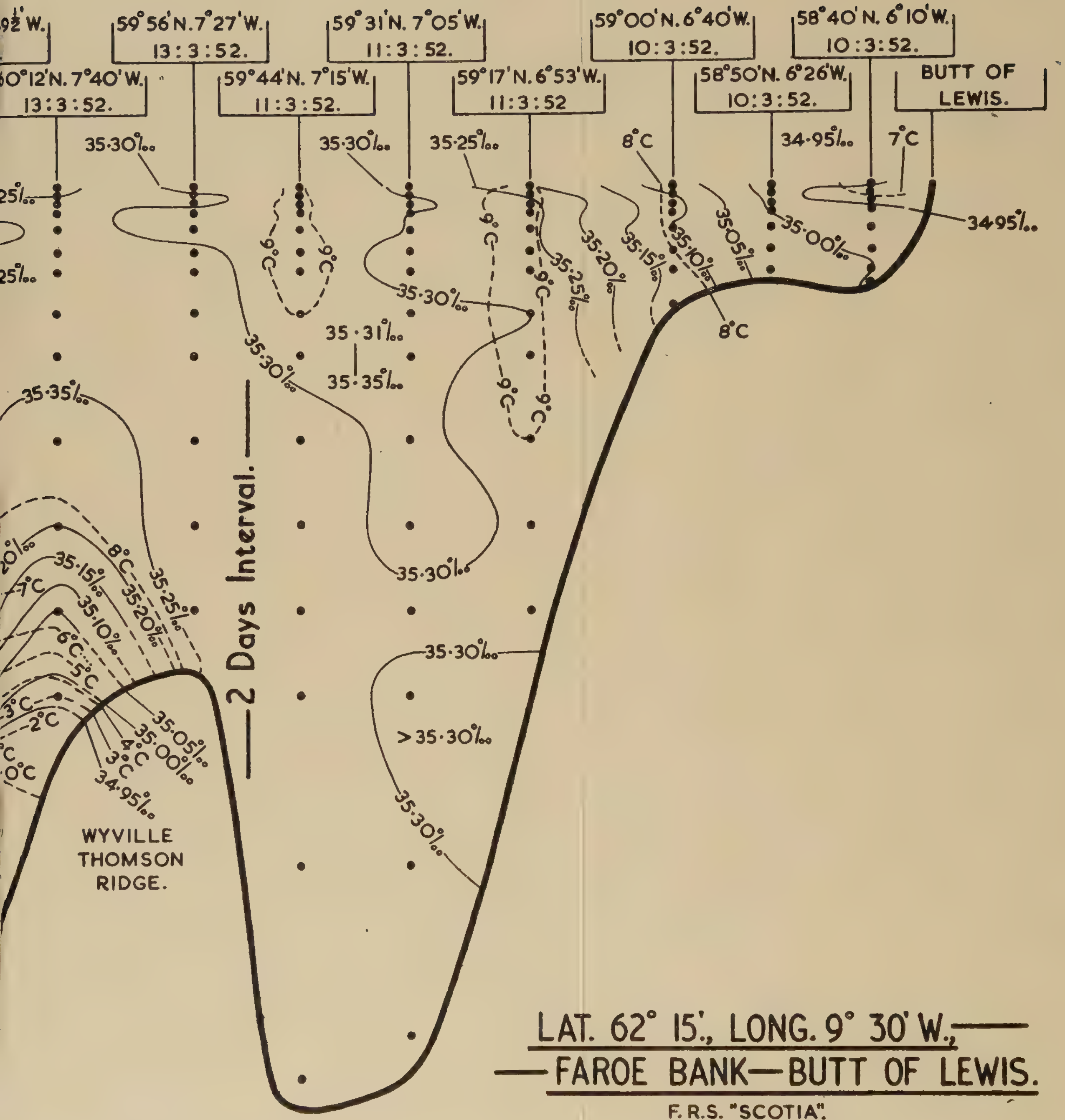

62°02'N. 9°18'W. 14:3:52.
61°35'N. 8°53'W. 14:3:52.
61°08'N. 8°29'W. 14:3:52.
60°45'N. 8°08'W. 13:3:52.
62°15'N. 9°30'W. 14.3:52.
61°48'N. 9°06'W. 14:3:52.
61°21½'N. 8°41'W. 14:3:52.
60°54'N. 8°16'W. 13:3:52.
60°35'N 8°00'W. 13:3:52.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
35·25‰
8°C
35·20‰
35·30‰
< 35·20‰
> 35·25‰
7°C
6°C
5°C
4°C
3°C
2°C
1°C
0°C
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·90‰
34·89‰
34·86‰
-0·01°C
-0·19°C
-0·58°C
FAROE BANK.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.

Fig. 7



LAT. 62° 15'., LONG. 9° 30' W.,——

—FAROE BANK—BUTT OF LEWIS.

F.R.S. "SCOTIA".

10–14 MARCH, 1952.

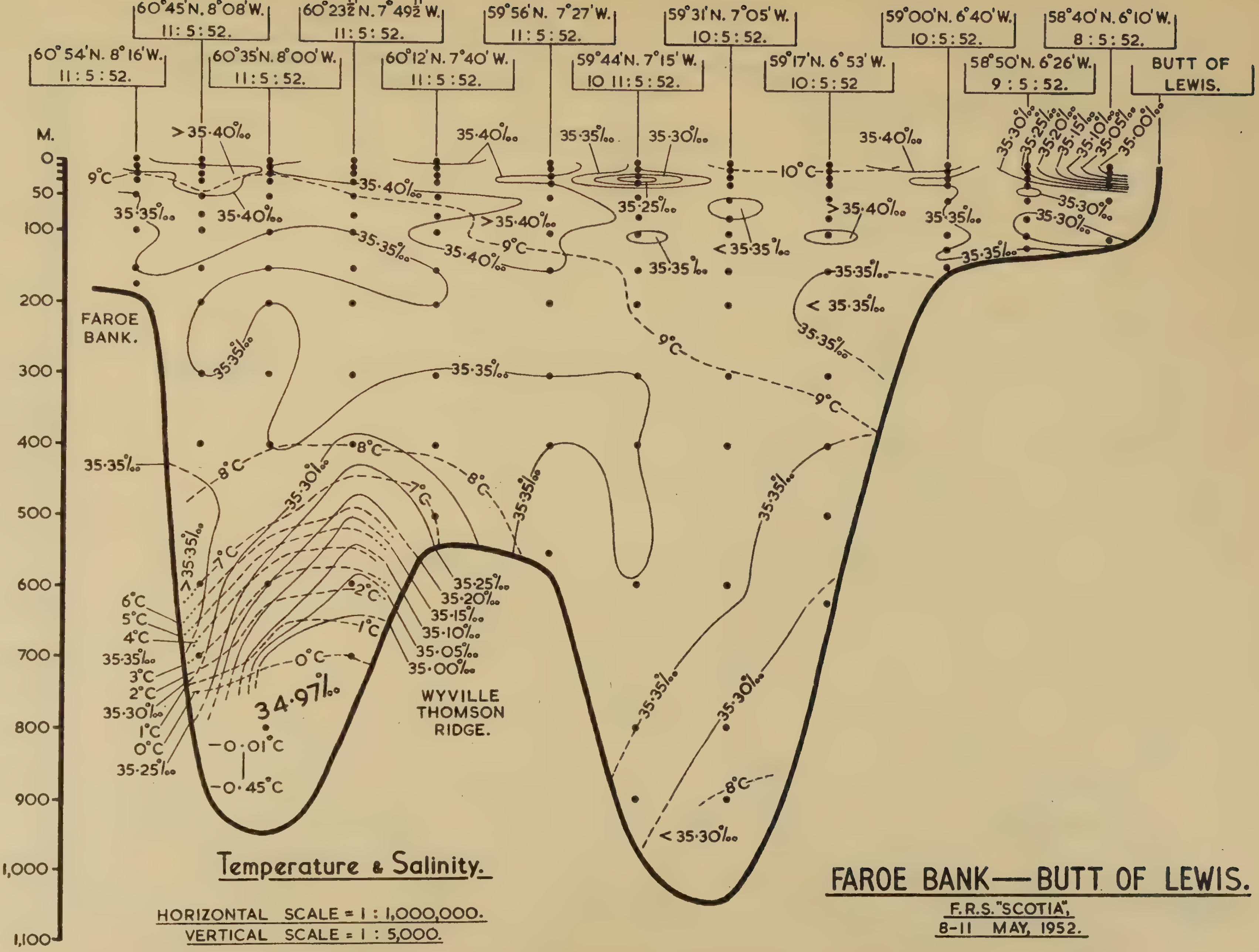

FAROE BANK—BUTT OF LEWIS.
F.R.S. "SCOTIA",
8-11 MAY, 1952.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
60°54'N. 8°16'W. 11:5:52.
60°45'N. 8°08'W. 11:5:52.
60°35'N. 8°00'W. 11:5:52.
60°23½'N. 7°49½'W. 11:5:52.
60°12'N. 7°40'W. 11:5:52.
59°56'N. 7°27'W. 11:5:52.
59°44'N. 7°15'W. 10 11:5:52.
59°31'N. 7°05'W. 10:5:52.
59°17'N. 6°53'W. 10:5:52
59°00'N. 6°40'W. 10:5:52.
58°50'N. 6°26'W. 9:5:52.
58°40'N. 6°10'W. 8:5:52.
BUTT OF LEWIS.
FAROE BANK.
WYVILLE THOMSON RIDGE.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
9°C
10°C
8°C
7°C
6°C
5°C
4°C
3°C
2°C
1°C
0°C
−0·01°C
−0·45°C
34·97‰
35·00‰
35·05‰
35·10‰
35·15‰
35·20‰
35·25‰
35·30‰
35·35‰
35·40‰
>35·40‰
<35·35‰
>35·35‰
<35·30‰

Fig. 73

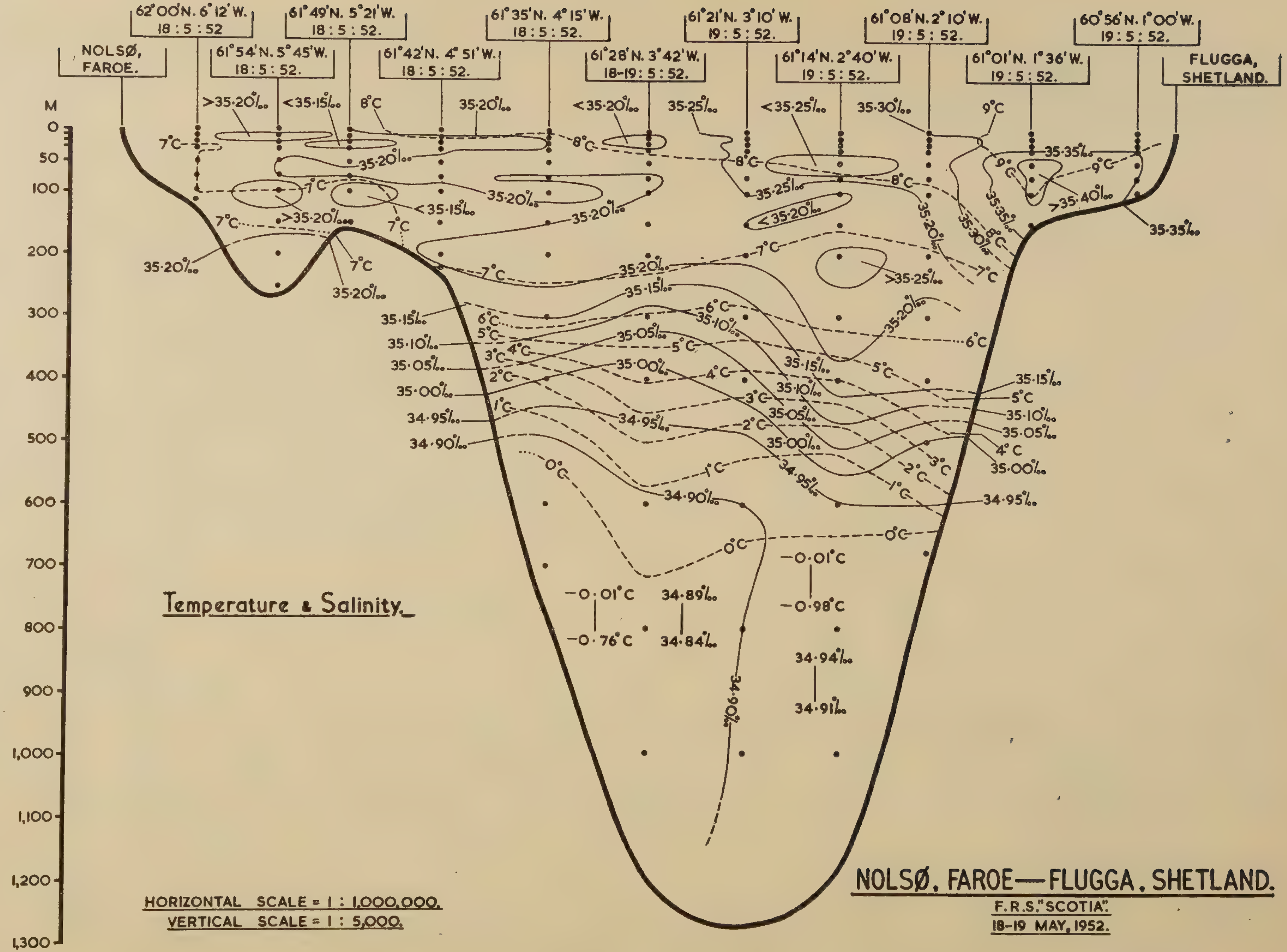

NOLSØ, FAROE.
62°00'N. 6°12'W. 18 : 5 : 52
61°54'N. 5°45'W. 18 : 5 : 52.
61°49'N. 5°21'W. 18 : 5 : 52.
61°42'N. 4°51'W. 18 : 5 : 52.
61°35'N. 4°15'W. 18 : 5 : 52.
61°28'N. 3°42'W. 18-19 : 5 : 52.
61°21'N. 3°10'W. 19 : 5 : 52.
61°14'N. 2°40'W. 19 : 5 : 52.
61°08'N. 2°10'W. 19 : 5 : 52.
61°01'N. 1°36'W. 19 : 5 : 52.
60°56'N. 1°00'W. 19 : 5 : 52.
FLUGGA, SHETLAND.
M
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
>35·20‰
<35·15‰
8°C
35·20‰
<35·20‰
35·25‰
<35·25‰
35·30‰
9°C
7°C
35·35‰
>35·40‰
>35·25‰
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·90‰
6°C
5°C
4°C
3°C
2°C
1°C
0°C
−0·01°C
−0·76°C
34·89‰
34·84‰
−0·98°C
34·94‰
34·91‰
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE—FLUGGA, SHETLAND.
F.R.S. "SCOTIA."
18–19 MAY, 1952.

FIG. 74

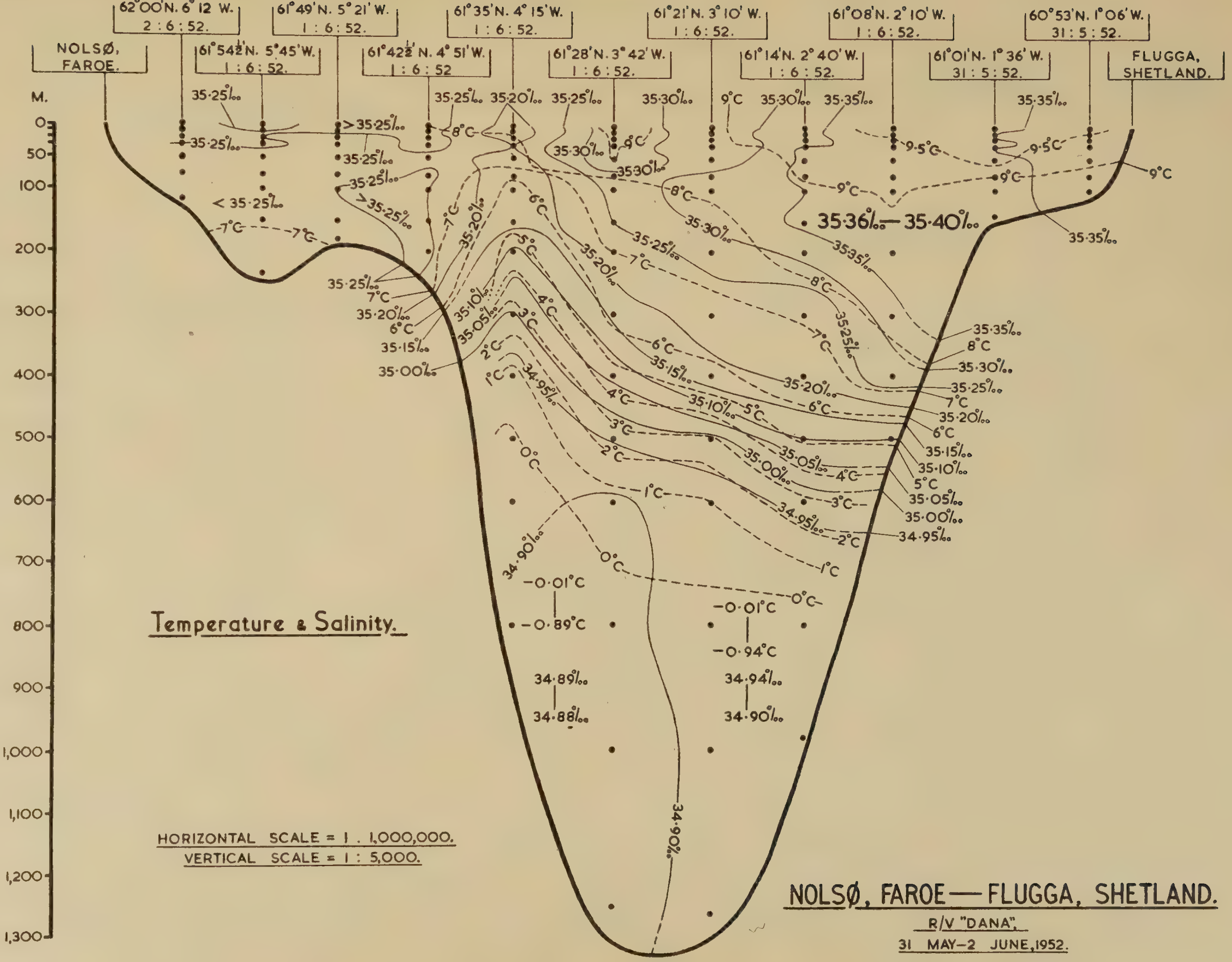

NOLSØ, FAROE.
62°00'N. 6° 12 W. 2 : 6 : 52.
61°54½'N. 5°45'W. 1 : 6 : 52.
61°49'N. 5°21'W. 1 : 6 : 52.
61°42½'N. 4° 51'W. 1 : 6 : 52
61°35'N. 4° 15'W. 1 : 6 : 52.
61°28'N. 3° 42'W. 1 : 6 : 52.
61°21'N. 3° 10'W. 1 : 6 : 52.
61°14'N. 2° 40'W. 1 : 6 : 52.
61°08'N. 2° 10'W. 1 : 6 : 52.
61°01'N. 1° 36'W. 31 : 5 : 52.
60°53'N. 1°06'W. 31 : 5 : 52.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
35·25‰
>35·25‰
<35·25‰
35·20‰
35·30‰
35·35‰
35·36‰—35·40‰
9·5°C
9°C
8°C
7°C
6°C
5°C
4°C
3°C
2°C
1°C
0°C
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·90‰
−0·01°C
−0·89°C
34·89‰
34·88‰
−0·01°C
−0·94°C
34·94‰
34·90‰
Temperature & Salinity.
HORIZONTAL SCALE = 1 . 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE — FLUGGA, SHETLAND.
R/V "DANA".
31 MAY–2 JUNE, 1952.

FIG. 75

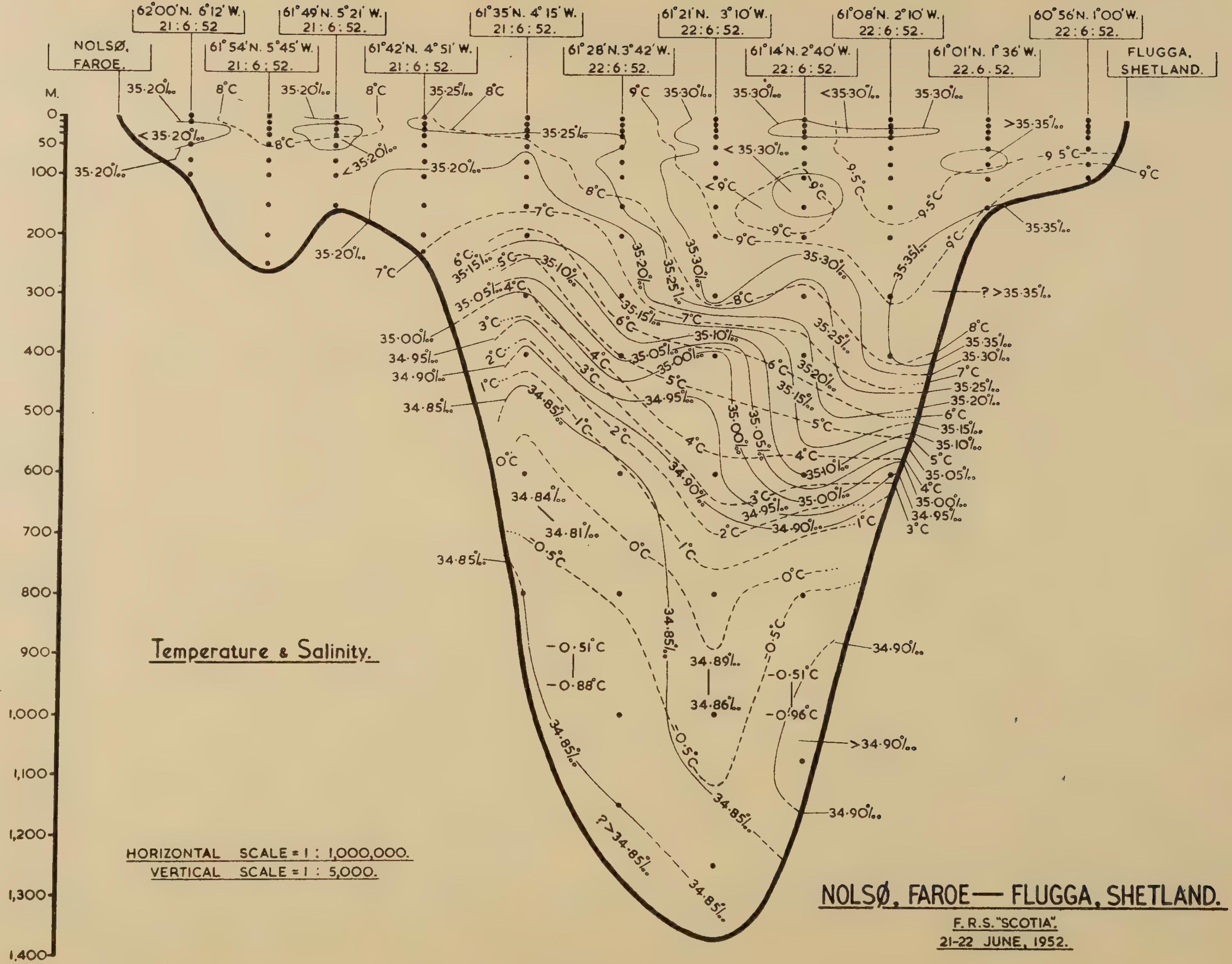

NOLSØ, FAROE.
62°00'N. 6°12' W. 21:6:52
61° 54'N. 5°45' W. 21:6:52.
61° 49'N. 5°21' W. 21:6:52.
61°42'N. 4°51' W. 21:6:52.
61°35'N. 4° 15' W. 21:6:52.
61°28'N. 3°42' W. 22:6:52.
61°21'N. 3°10'W. 22:6:52.
61°14'N. 2°40'W. 22:6:52.
61°08'N. 2°10' W. 22:6:52.
61°01'N. 1°36' W. 22.6.52.
60°56'N. 1°00'W. 22:6:52.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
1,400
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE— FLUGGA, SHETLAND.
F.R.S. "SCOTIA".
21-22 JUNE, 1952.
35·20‰
<35·20‰
8°C
35·25‰
9°C
35·30‰
<35·30‰
>35·35‰
9·5°C
35·35‰
? >35·35‰
7°C
6°C
5°C
4°C
3°C
2°C
1°C
0°C
-0·5°C
35·15‰
35·10‰
35·05‰
35·00‰
34·95‰
34·90‰
34·85‰
34·84‰
34·81‰
-0·51°C
-0·88°C
34·89‰
34·86‰
-0·96°C
>34·90‰
? >34·85‰

Fig. 76

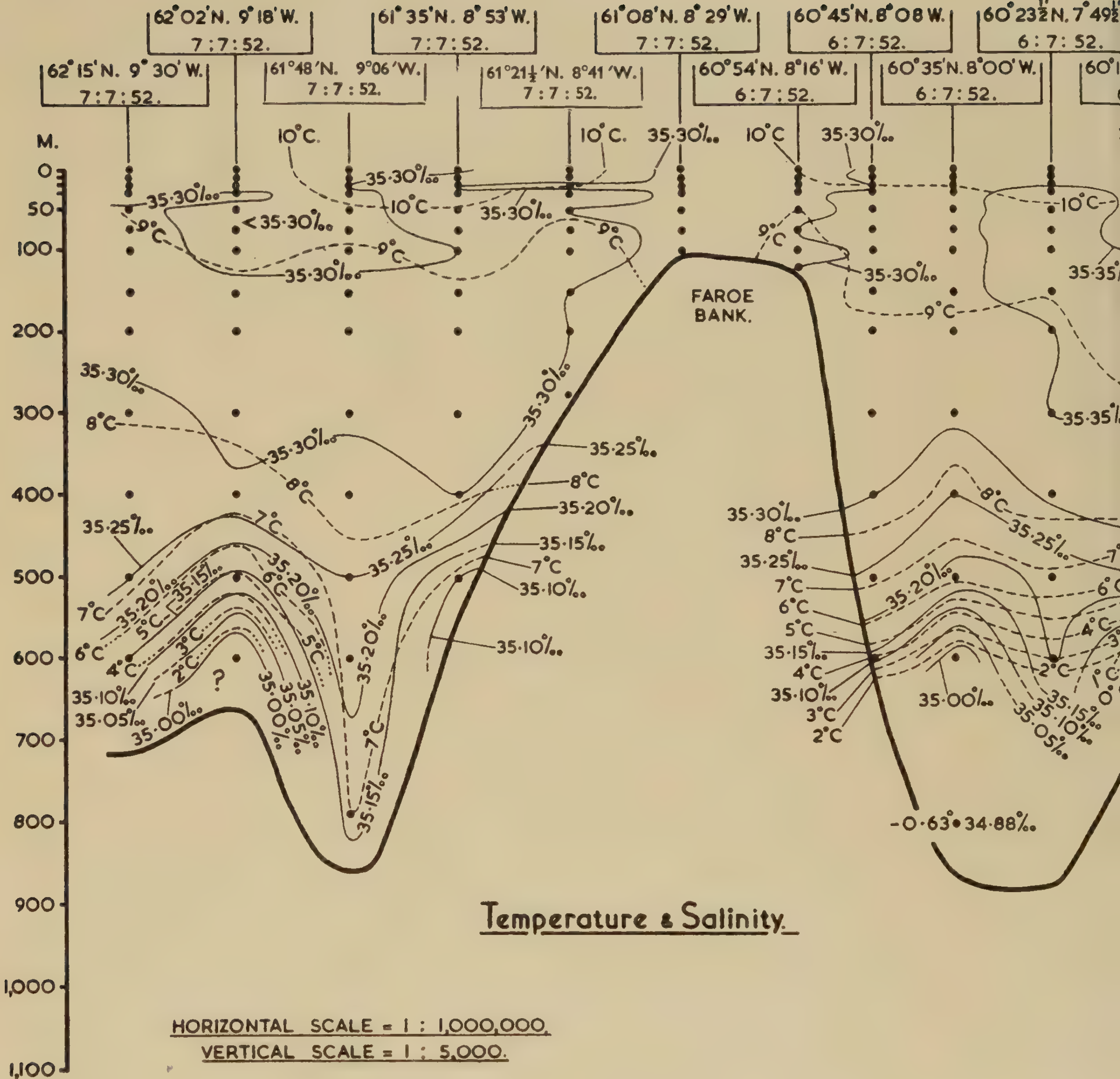
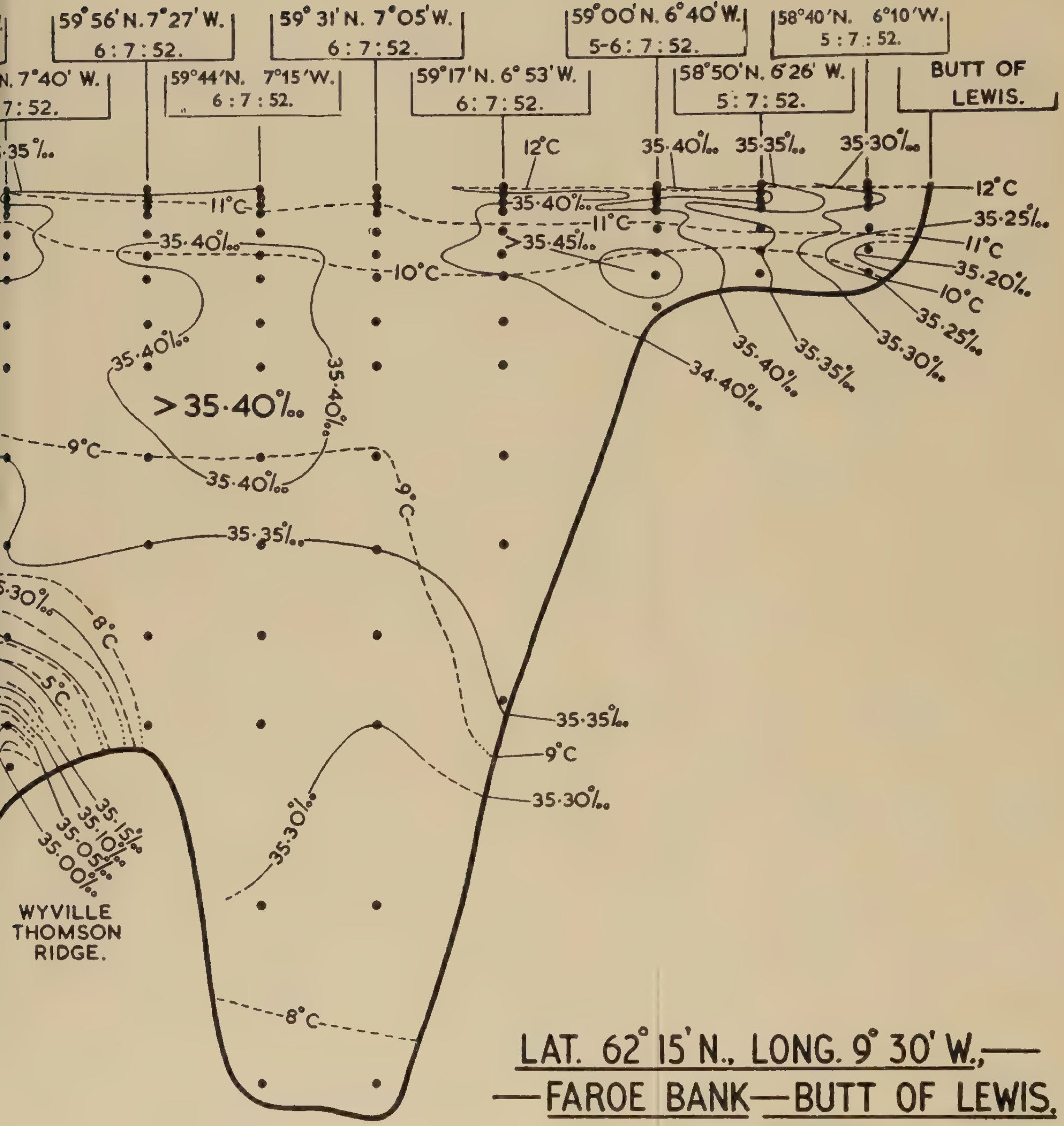

62° 15′ N. 9° 30′ W. 7:7:52.
62° 02′ N. 9° 18′ W. 7:7:52.
61° 48′ N. 9° 06′ W. 7:7:52.
61° 35′ N. 8° 53′ W. 7:7:52.
61° 21½′ N. 8° 41′ W. 7:7:52.
61° 08′ N. 8° 29′ W. 7:7:52.
60° 54′ N. 8° 16′ W. 6:7:52.
60° 45′ N. 8° 08 W. 6:7:52.
60° 35′ N. 8° 00′ W. 6:7:52.
60° 23½′ N. 7° 49½
6:7:52.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
10° C.
35·30‰
9° C.
8° C.
7° C.
6° C.
5° C.
4° C.
3° C.
2° C.
35·25‰
35·20‰
35·15‰
35·10‰
35·05‰
35·00‰
35·35‰
< 35·30‰
?
FAROE BANK.
-0·63° • 34·88‰
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.

FIG. 77



LAT. 62° 15' N., LONG. 9° 30' W.,—
—FAROE BANK—BUTT OF LEWIS.

F. R. S. "SCOTIA"
5–7 JULY, 1952.

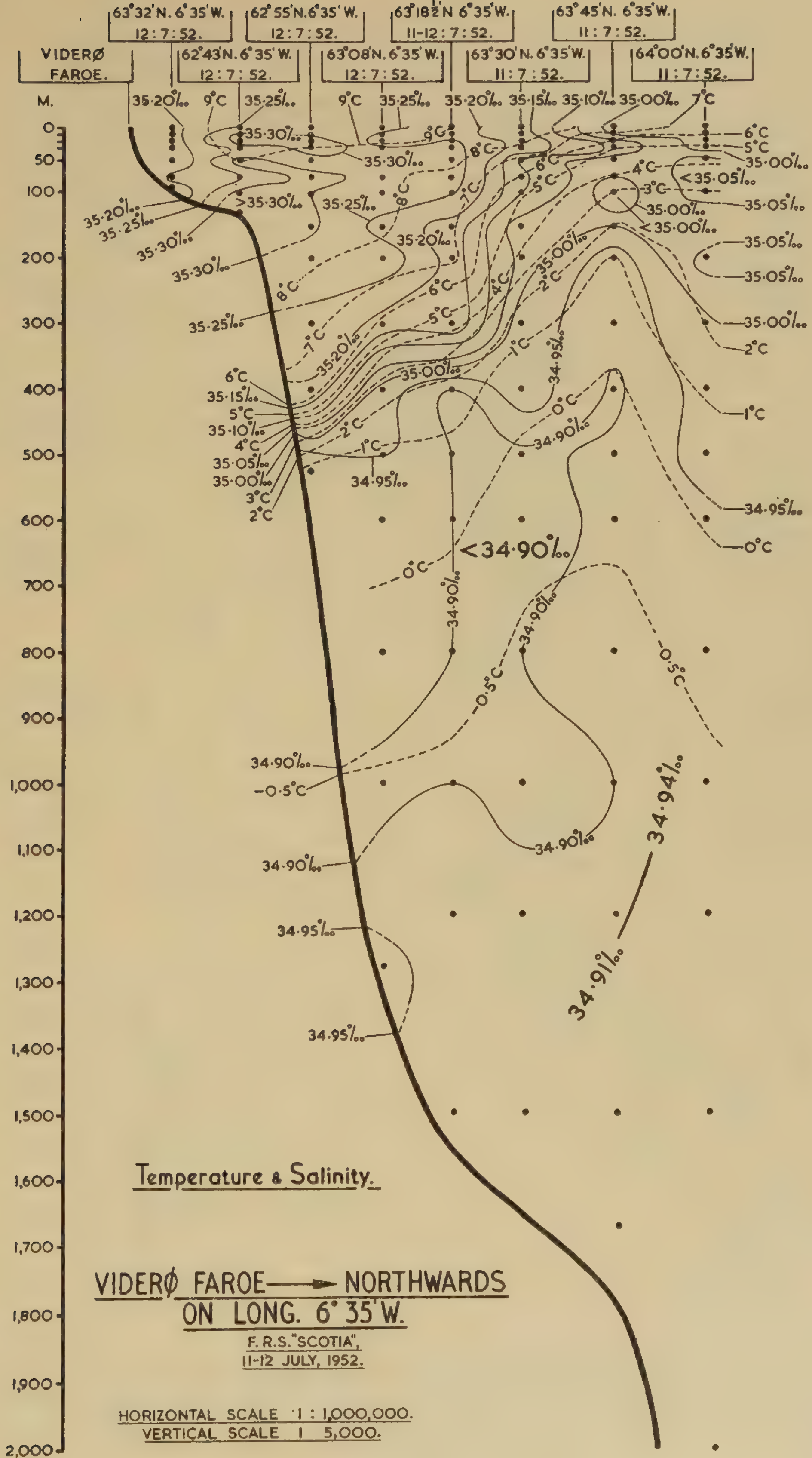

VIDERØ FAROE.
63° 32' N. 6° 35' W. 12 : 7 : 52.
62° 43' N. 6° 35' W. 12 : 7 : 52.
62° 55' N. 6° 35' W. 12 : 7 : 52.
63° 08' N. 6° 35' W. 12 : 7 : 52.
63° 18½' N 6° 35' W. 11-12 : 7 : 52.
63° 30' N. 6° 35' W. 11 : 7 : 52.
63° 45' N. 6° 35' W. 11 : 7 : 52.
64° 00' N. 6° 35' W. 11 : 7 : 52.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
1,400
1,500
1,600
1,700
1,800
1,900
2,000
35·20‰
9°C
35·25‰
9°C
35·25‰
35·20‰
35·15‰
35·10‰
35·00‰
7°C
35·30‰
9°C
8°C
35·30‰
6°C
5°C
4°C
3°C
<35·05‰
35·00‰
<35·00‰
6°C
5°C
35·00‰
35·05‰
35·05‰
35·05‰
35·00‰
2°C
1°C
34·95‰
0°C
35·20‰
35·25‰
35·30‰
>35·30‰
35·25‰
8°C
7°C
35·20‰
35·30‰
8°C
6°C
5°C
4°C
35·00‰
2°C
35·25‰
7°C
35·20‰
35·00‰
1°C
34·95‰
0°C
34·90‰
6°C
35·15‰
5°C
35·10‰
4°C
35·05‰
35·00‰
3°C
2°C
2°C
1°C
34·95‰
<34·90‰
0°C
34·90‰
34·90‰
-0·5°C
-0·5°C
34·90‰
-0·5°C
34·90‰
34·90‰
34·95‰
34·95‰
34·94‰
34·91‰
Temperature & Salinity.
VIDERØ FAROE → NORTHWARDS
ON LONG. 6° 35' W.
F.R.S. "SCOTIA",
11-12 JULY, 1952.
HORIZONTAL SCALE 1 : 1,000,000.
VERTICAL SCALE 1 : 5,000.

Fig. 78

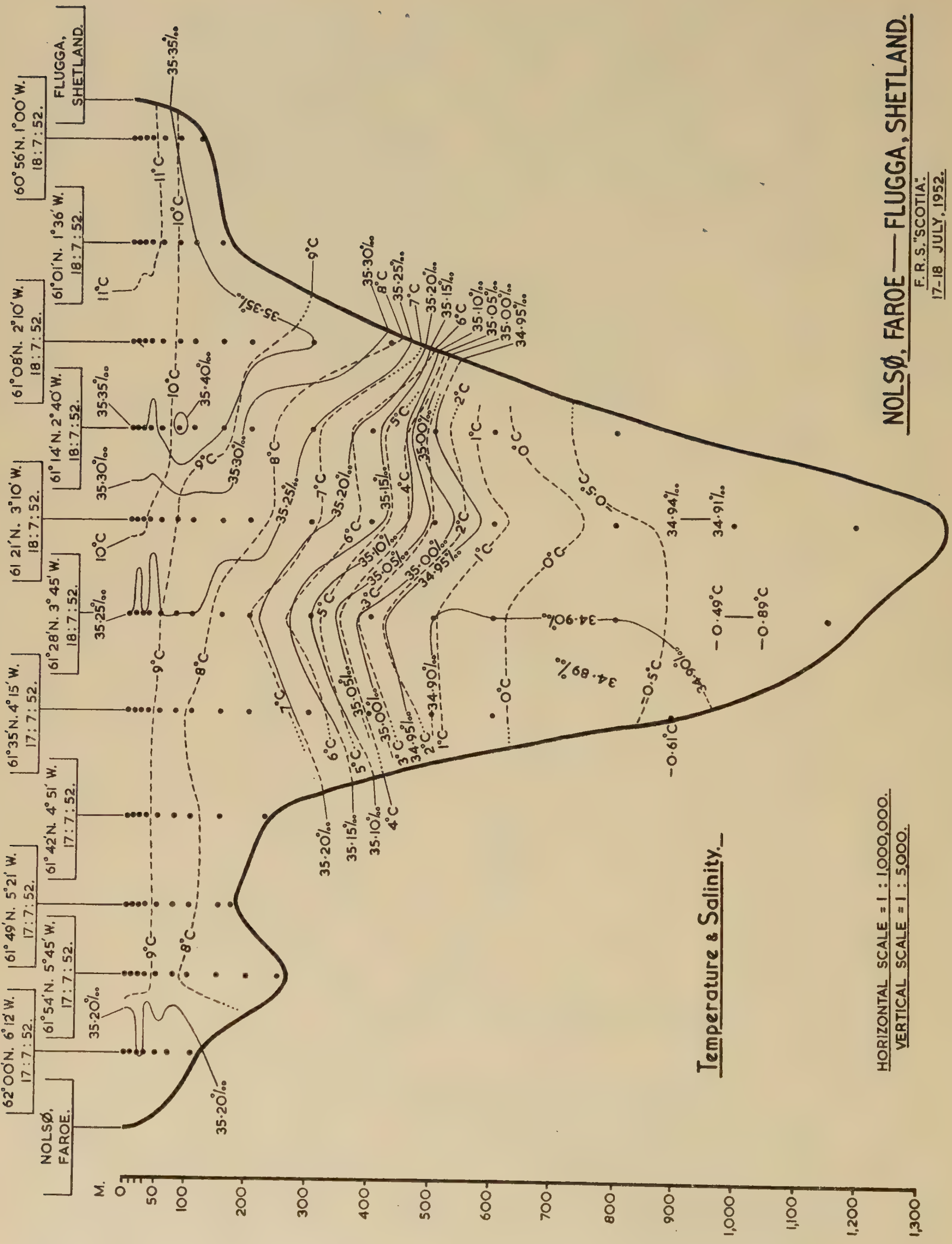

NOLSØ, FAROE —— FLUGGA, SHETLAND.
F. R. S. "SCOTIA."
17-18 JULY, 1952.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE.
62°00'N. 6°12'W. 17 : 7 : 52.
61°54'N. 5°45'W. 17 : 7 : 52.
61°49'N. 5°21'W. 17 : 7 : 52.
61°42'N. 4°51'W. 17 : 7 : 52.
61°35'N. 4°15'W. 17 : 7 : 52.
61°28'N. 3°45'W. 18 : 7 : 52.
61°21'N. 3°10'W. 18 : 7 : 52.
61°14'N. 2°40'W. 18 : 7 : 52.
61°08'N. 2°10'W. 18 : 7 : 52.
61°01'N. 1°36'W. 18 : 7 : 52.
60°56'N. 1°00'W. 18 : 7 : 52.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
35·20‰
35·20‰
9°C
8°C
35·25‰
10°C
35·30‰
35·35‰
35·40‰
10°C
9°C
35·30‰
8°C
35·25‰
7°C
35·20‰
6°C
35·15‰
5°C
35·10‰
4°C
35·05‰
3°C
35·00‰
34·95‰
2°C
1°C
0°C
0·5°C
34·90‰
34·89‰
34·94‰
34·91‰
−0·49°C
−0·89°C
−0·61°C
35·35‰
11°C
10°C
11°C
9°C
35·30‰
8°C
35·25‰
7°C
35·20‰
35·15‰
6°C
35·10‰
35·05‰
35·00‰
34·95‰
35·20‰
35·15‰
35·10‰
4°C

Fig. 79

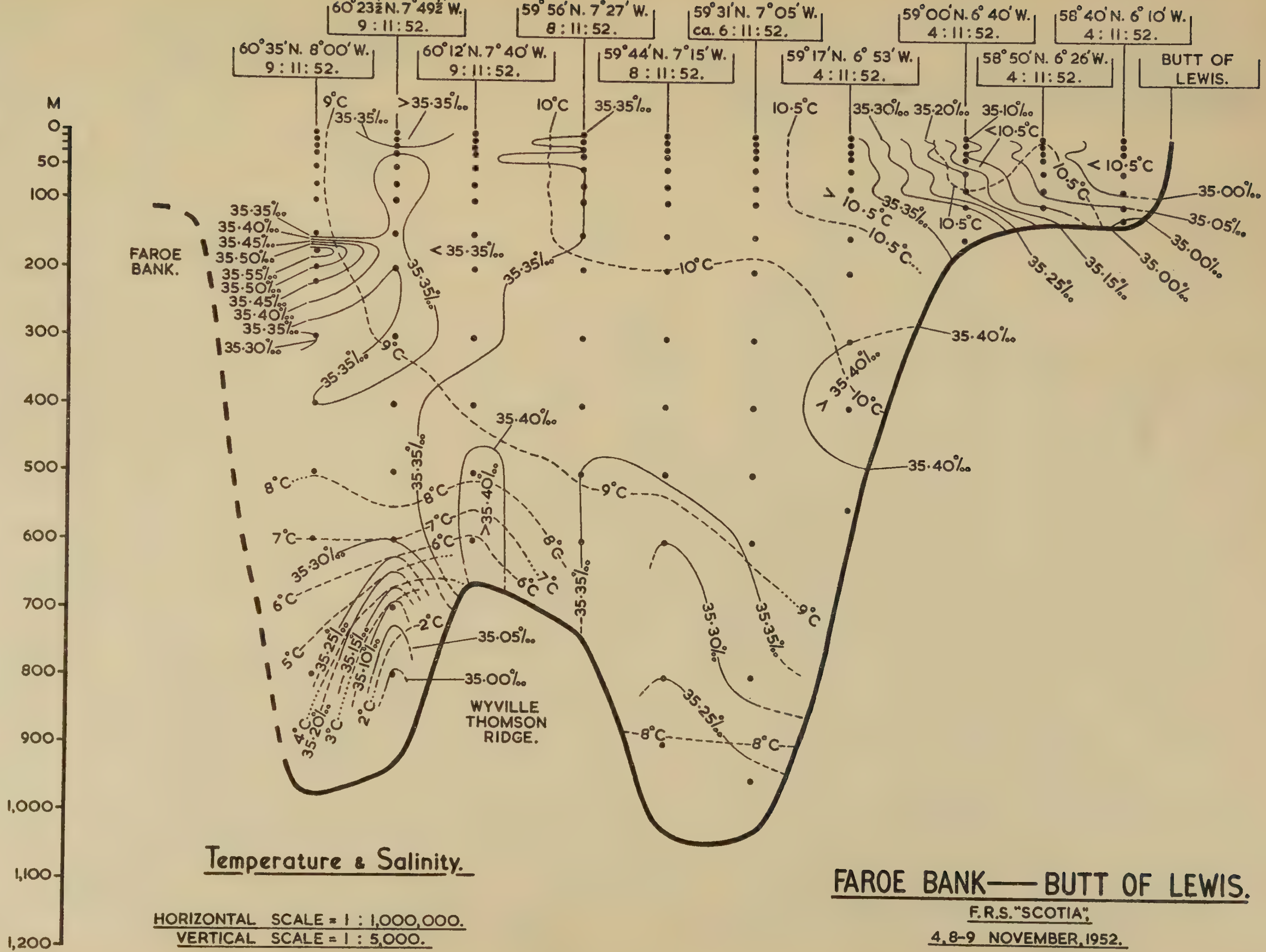

60°35′N. 8°00′W. 9:11:52.
60°23½′N. 7°49½′W. 9:11:52.
60°12′N. 7°40′W. 9:11:52.
59°56′N. 7°27′W. 8:11:52.
59°44′N. 7°15′W. 8:11:52.
59°31′N. 7°05′W. ca. 6:11:52.
59°17′N. 6°53′W. 4:11:52.
59°00′N. 6°40′W. 4:11:52.
58°50′N. 6°26′W. 4:11:52.
58°40′N. 6°10′W. 4:11:52.
BUTT OF LEWIS.
M
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
FAROE BANK.
WYVILLE THOMSON RIDGE.
9°C
10°C
10·5°C
< 10·5°C
> 10·5°C
8°C
7°C
6°C
5°C
4°C
3°C
2°C
35·00‰
35·05‰
35·10‰
35·15‰
35·20‰
35·25‰
35·30‰
35·35‰
> 35·35‰
< 35·35‰
35·40‰
> 35·40‰
35·45‰
35·50‰
35·55‰
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
FAROE BANK—BUTT OF LEWIS.
F.R.S. "SCOTIA",
4, 8–9 NOVEMBER, 1952.

FIG. 80

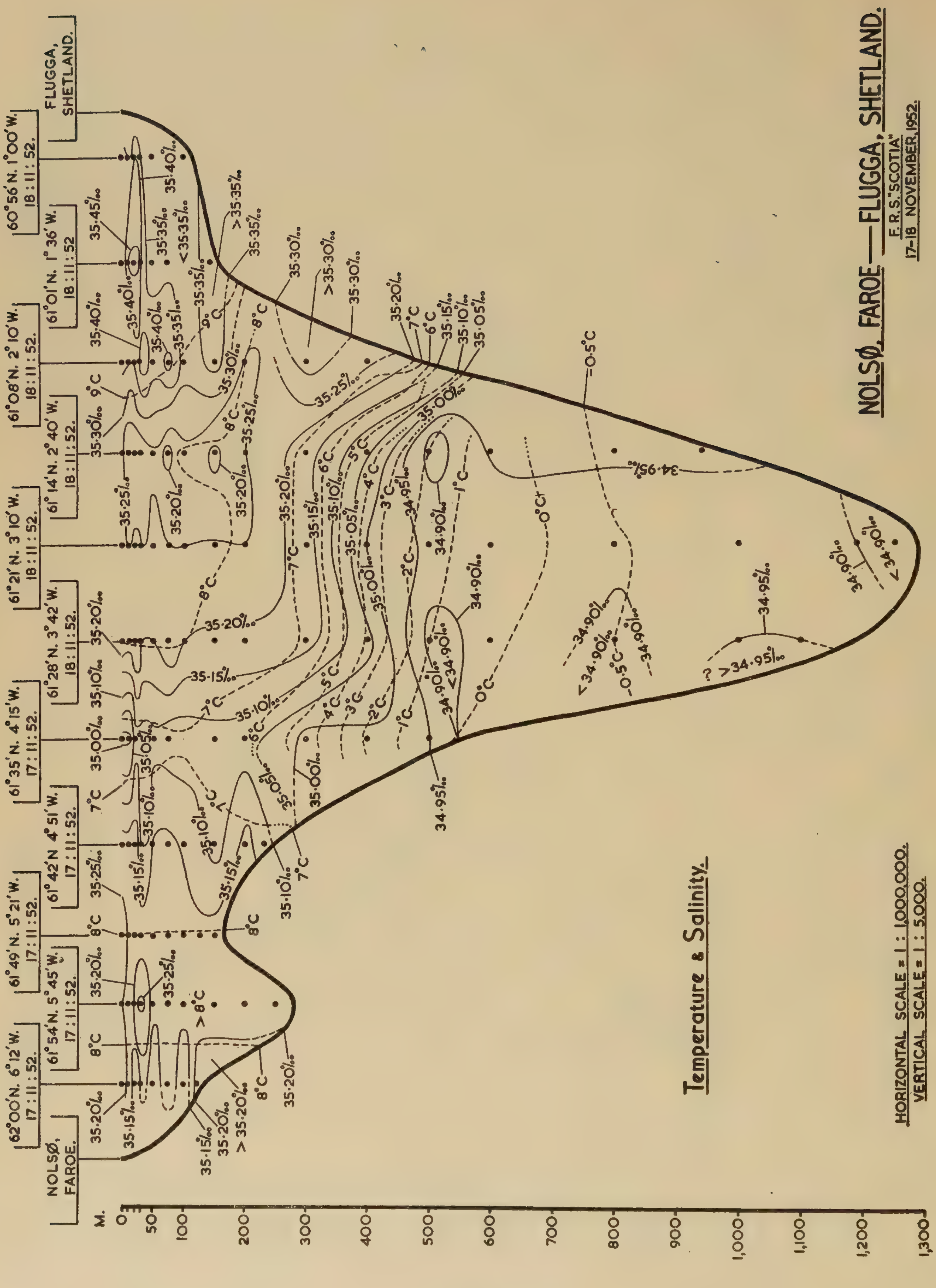

NOLSØ, FAROE—FLUGGA, SHETLAND.
F.R.S. "SCOTIA"
17–18 NOVEMBER, 1952.
Temperature & Salinity.
HORIZONTAL SCALE = 1 : 1,000,000.
VERTICAL SCALE = 1 : 5,000.
NOLSØ, FAROE.
62°00′N. 6°12′W. 17 : 11 : 52.
61°54′N. 5°45′W. 17 : 11 : 52.
61°49′N. 5°21′W. 17 : 11 : 52.
61°42′N. 4°51′W. 17 : 11 : 52.
61°35′N. 4°15′W. 17 : 11 : 52.
61°28′N. 3°42′W. 18 : 11 : 52.
61°21′N. 3°10′W. 18 : 11 : 52.
61°14′N. 2°40′W. 18 : 11 : 52.
61°08′N. 2°10′W. 18 : 11 : 52.
61°01′N. 1°36′W. 18 : 11 : 52.
60°56′N. 1°00′W. 18 : 11 : 52.
FLUGGA, SHETLAND.
M.
0
50
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
35·15‰
35·20‰
>35·20‰
35·25‰
35·30‰
>35·30‰
35·35‰
>35·35‰
<35·35‰
35·40‰
35·45‰
35·10‰
35·05‰
35·00‰
34·95‰
34·90‰
<34·90‰
>34·95‰
8°C
>8°C
9°C
7°C
6°C
5°C
4°C
3°C
2°C
1°C
0°C
0·5°C
-0·5°C

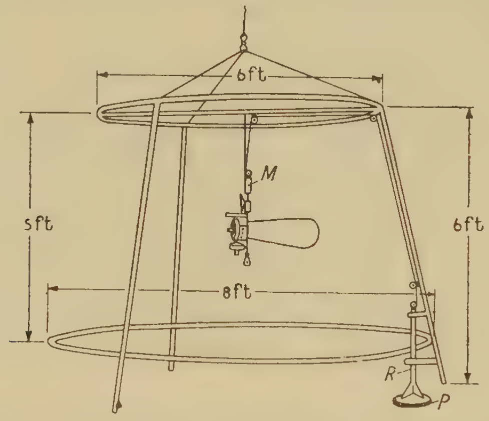
FIG. 81

APPENDIX I

The Levels of Zero Horizontal Dynamic Potential in the Faroe-Shetland Channel

As stated on page 4, the bases of conversion of the relative results of the normal hydrodynamical computational essays of the foregoing memoir into absolute values of volume transport of oceanic water through the Faroe-Shetland Channel, are the assumptions of zero horizontal dynamic potential at the mean summit level of the Wyville Thomson Ridge, namely, 550 metres, on the one hand, and at the level of the 35·00‰ isohaline on the other. Under remarkably calm weather conditions during the month of May 1953, from the research ship *Scotia*, experimental verification of these assumptions was apparently obtained in the following way.

An old pattern, but mechanically sound and efficient, Ekman current meter was lowered to rest at approximately one metre above the sea floor at three positions along the summit of the Wyville Thomson Ridge and, at each of these positions, allowed to function *independently of the research vessel* for a period of about 30 minutes. This was accomplished by suspending the current meter within a large, open, tubular-steel tripod as illustrated in the adjoining diagram, the whole being lowered on 4 mm-diameter stranded steel warp which, when the apparatus came to rest on the bottom, was paid out slack according to the drifting of the ship, which in fact in all three cases was comparatively small. The meter was activated and re-locked at almost precise instants at the beginning and end of each 30-minute period by operation of the moveable metal plate P, which, through its connecting-rod R and an attached cord, released and withdrew the operative brass messenger M on contact with, and on withdrawal from, the sea bed. Before each bottom assessment the current meter was suspended for five-minute intervals at a depth of 10 metres beneath the sea surface, essentially to ensure that it was working efficiently immediately prior to the main experiment. In these tests, in which of course the meter was not entirely independent of the ship, current velocities of from 2 to 17 centimetres per second toward NE were registered. In each of the main experiments, conducted at the positions and depths cited below, no appreciable horizontal current was recorded. In two cases, the first and the third, no registration whatever was recorded by the current meter, while in the second experiment, only about six revolutions of the propellor in 32 minutes signified the negligible horizontal velocity of scarcely 0·5 centimetres per second.



The positions and depths of these experiments were:—

Latitude 59°59′N, Longitude 6°52½′W, 460 metres.
„ 60°12′N „ 7°40′W, 622 „
„ 60°20½′N „ 8°18′W, 550 „

Confirmation of zero horizontal current level as coincident with the 35·00‰ isohaline on the hydrographic section between Faroe and Shetland was not, of course, so confidently to be achieved by current meter because of the impossibility of operating the meter independently of the ship. Again, however, under almost perfect weather conditions, the drift of the vessel was almost imperceptible and the attempt to measure current at the 35·00‰ isohaline was made at the position, latitude 61°14′N, longitude 2°40′W, where the bottom sounding was 1153 metres. First of all, by careful hydrometric assessment by means of attested Kiel hydrometers for sea density determination, the position of the 35·00‰ isohaline intersection with the station vertical at this position was estimated as at the depth of 260 metres. Operated at this depth for a period of just over five minutes, the vector of 0·63 centimetres per second, somewhat to the north of north-east in direction, was registered by the suspended current meter. When the more accurately determined salinity values for serial depths from surface to bottom at this position became known, it was found that the above-determined depth of the 35·00‰ isohaline intersection was probably short by about 12 metres of the true depth of intersection, so that at least near and partial confirmation of the basic assumption underlying the absolute volume transport computations on the hydrographic section between Faroe and Shetland, may be said also, by this instance, to have been achieved. Unfortunately, the favourable conditions which had prevailed to this point thereafter deteriorated to such an extent as to preclude further similar experimentation at other positions on this section.

In this connection, however, it is of interest to record here the result of more recent experiments in approximately the same region with modern apparatus designed to determine current directions and speeds at approximately known sub-surface levels in the sea. The apparatus is that described by Swallow (1955) as "a neutral-buoyancy float for measuring deep currents," with subsequent technical improvements enhancing the accuracy of the depth location of the float.

Over a period of 26½ hours between April 30 and May 2, 1956, about the mean position of latitude 61°35′N, longitude 3°52′W, one of these neutral-buoyancy floats was observed to travel in the direction 250° (true) ±20° at an average speed of 13±3 cm/sec. at a mean depth of 840±50 metres. This depth was well within the bottom water-mass of intermediate Arctic water which contemporary temperature and salinity observations showed to exist at this time and place below about 500 metres depth. At about the same time, in 14¼ hours between May 2 and 3, 1956, a neutral-buoyancy float set at 340±20 metres within the overlying oceanic water-mass, in the mean position of about latitude 61°40′N, longitude 3°58′W, drifted at 22±0·5 cm/sec. in the almost contrary direction of 359°±2° (true).

In relation to the standard Scottish hydrographic section between Faroe and Shetland, on which the above positions were very nearly situated, the foregoing results evidently imply a level or zone of zero horizontal velocity at right angles to the section somewhere between about 350 and 840 metres, and it is not improbable that, as originally assumed in the foregoing dynamic investigation, this level or zone was more or less nearly coincident with the 35·00‰ isohaline defining the base of the oceanic water-mass.*

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*I am indebted to Dr. J. C. Swallow of the British National Institute of Oceanography for his consent to include this reference to experiments at which I was privileged to be present.

APPENDIX II

TABLES OF DYNAMIC COMPUTATIONS OF FAROE-SHETLAND CHANNEL HYDROGRAPHIC SECTIONS, 1927-1952

EXPLANATION. The sections are arranged chronologically, each being designated by its geographical terminal positions, naming approximate land terminals where possible. The computations, however, embrace only those parts of the sections between the first and last defined sea positions on each. There are also given the inclusive dates of each section and the name of the research vessel from which the basic observations of temperature, and the sea water samples for salinity determinations, were taken.

The exact position of each observation station is defined in degrees and minutes of latitude and longitude (Greenwich). In the majority of instances these positions are probably accurate to within 2-3 nautical miles. Beneath the station position the bottom sounding is given in metres (*m.*). Wind direction and force (Beaufort scale), where available, appear to the left of the station position, and the date and approximate terminal times of the station, to the right. In most cases these terminal times include periods of biological work in addition to the acquisition of the physical observations; nor are they always expressed in Greenwich Mean Time. These data, however, are not used absolutely in the investigation and accordingly corrections and allowances have not been made.

The headings, with meanings, of the seven columns of the tables are as follows:—

m, expresses (*a*), in metres, the depths from the sea surface at which the observations of temperature, salinity, and density apply, and (*b*), in decibars, the pressure relative to the values of the fifth, sixth, and seventh columns of the tables.

t°C is the temperature observation on the Centigrade scale, corrected for instrumental error and, where appropriate or necessary, for adiabatic and depth errors.

S‰ is the customary expression of salinity in parts by weight per thousand, also corrected where necessary for depth error.

σ_t gives, in the accepted modified form, the density of the water at the observed temperature, disregarding compression.

$10^5\delta$ is 100,000 times the anomaly, from that of water of zero temperature Centigrade and salinity of 35.00‰ at the same isobaric surface, of the specific volume of the water *in situ* at the isobaric surface of the first column of the tables.

$\triangle D$ expresses, in dynamic metres, the difference between the actual dynamic depth beneath the sea surface of the isobaric surface of the first column and that of the same surface in water of 0°C and 35.00‰ salinity.

$\int_0^{z_1} \triangle D\,dz$ is the numerical integration from the sea surface (o) to a given depth (z_1) of the values in the preceding column.

Bracketed numbers in the first column of the tables signify interpolated or extrapolated data from corrected curves of temperature, salinity and density, or from sectional diagrams of specific volume anomaly distributions constructed to the same scale as the corresponding diagrams (Figures 8 to 81 inclusive) of temperature and salinity distributions.

The determination of oceanic water volume transport through each section is explained in the text, p. 13.

1927

SYDERØ, FAROE—FAIR ISLE

F.R.S. *EXPLORER*

7·9 August, 1927

ENE. 2. 61°12′N 6°33′W 8/9.8.27
152 m. 2245-0045

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·41	35·14	26·82	124		
10	·40	·19	·87	120	·0122	
20	10·56	·16	·99	108	·0236	
30	9·83	·19	27·14	94	·0337	
40	·50	·16	·18	91	·0429	
60	8·56	·20	·36	74	·0594	
80	·39	·16	·35	75	·0743	
100	·37	·21	·40	71	·0889	
150	·02	·20	·44	68	·1237	
[200]				64	·1567	
[245]				58	·1841	24·8495

SE. 2. 60°57′N 5°47′W 8.8.27
340 m. 1645-1830

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	12·72	35·19	26·61	144		
10	·70	·19	·62	143	·0144	
20	11·55	·19	·84	123	·0277	
30	10·80	·24	27·01	107	·0392	
40	9·14	·23	·29	80	·0486	
60	8·40	·23	·41	69	·0635	
80	·14	·21	·43	68	·0772	
100	·01	·23	·47	64	·0904	
200	7·55	·23	·54	59	·1519	
[245]				56	·1778	
[300]				52	·2074	24·7932
335	6·77	·23	·66	50		
[370]				42	·2403	51·0095

SE. 3-4. 60°40′N 4°50′W 8.8.27
1120 m. 0800-1300

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	12·91	35·18	26·57	148		
10	·90	·29	·65	141	·0144	
20	10·43	·29	27·12	96	·0262	
30	9·38	·29	·30	79	·0350	
40	8·92	·29	·37	73	·0426	
60	·21	·27	·47	64	·0563	
80	·05	·26	·49	62	·0689	
100	7·99	·18	·44	67	·0818	
200	·53	·18	·51	62	·1463	
300	6·87	·18	·61	54	·2043	
[370]				41	·2375	49·1150
[380]				39	·2415	51·4840
400	4·06	34·99	·80	35		

SE. 3. 60°26′N 4°02′W 8.8.27
655 m. 0100-0450

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	13·29	35·20	26·50	154		
10	·25	·21	·52	153	·0154	
20	12·12	·17	·71	135	·0298	
30	11·32	·17	·86	121	·0426	
40	10·15	·23	27·12	97	·0535	
60	8·68	·26	·39	71	·0703	
80	·01	·18	·43	68	·0842	
100	7·76	·26	·52	60	·0970	
200	6·93	·16	·58	55	·1545	
300	5·02	·08	·76	39	·2015	
[340]				34	·2161	44·4675
[380]				29	·2287	53·3235
400	2·79	34·94	·88	26		

ESE. 3. 60°17′N 3°36′W 7.8.27
247 m. 2100-2300

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	13·11	35·32	26·63	142		
10	·11	·35	·66	140	·0141	
20	12·54*	·35	·77	129	·0275	
30	11·08	·37	27·06	102	·0391	
40	10·59	·40	·18	91	·0487	
60	·00	·45	·32	78	·0656	
80	9·82	·45	·35	76	·0810	
100	·74	·45	·36	75	·0961	
200	·38	·44	·42	71	·1691	
[210]				73	·1763	20·4175
245	·28	·33	·35	79		
[300]				66	·2376	
[340]				54	·2616	49·0095

*Mean of three readings.

ESE. 3. 60°02′N 3°13′W 7.8.27
174 m. 1635-1845

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	13·52	35·18	26·44	160		
10	·50	·18	·45	159	·0160	
20	·25	·23	·53	152	·0316	
30	12·17*	·19	·72	134	·0459	
40	10·28	·28	27·14	95	·0573	
60	9·70	·32	·27	83	·0751	
80	·43	·27	·28	82	·0916	
100	·20	·34	·37	74	·1072	
[135]				73	·1329	10·4023
140	·09	·34	·39	73		
170	8·83	·33	·42	71		
[200]				71	·1797	
[210]				73	·1869	22·3785

*Mean of two readings.

ESE. 2-3. 59°46′N 2°21′W 7.8.27
92 m. 1055-1325

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	12·70	34·92	26·41	163		
10	·65	·94	·43	161	·0162	
20	·35	·94	·49	156	·0320	
30	·02	·99	·59	147	·0472	
40	10·61	·93	·81	126	·0608	
60	·20	35·00	·93	115	·0849	
[80]				107	·1071	
89	9·74	·06	27 06	103		
[100]				100	·1278	
[135]				85	·1602	12·0240

VOLUME TRANSPORT

		Km^3/hr
61°12′N 6°33′W.	ΔQ=·1841×245−24·8495=20·2550	+0·42
60°57′N 5°47′W.	ΔQ=·1778×245−24·7932=18·7678	
”	ΔQ=·2403×370−51·0095=37·9015	−0·24
60°40′N 4°50′W.	ΔQ=·2375×370−49·1150=38·7600	
”	ΔQ=·2415×380−51·4840=40·2860	+1·90
60°26′N 4°02′W.	ΔQ=·2287×380−53·3235=33·5825	
”	ΔQ=·2161×340−44·4675=29·0065	−3·11
60°17′N 3°36′W.	ΔQ=·2616×340−49·0095=39·9345	
”	ΔQ=·1763×210−20·4175=16·6055	−0·08
60°02′N 3°13′W.	ΔQ=·1869×210−22·3785=16·8705	
”	ΔQ=·1329×135−10·4023= 7·5392	−0·59
59°46′N 2°21′W.	ΔQ=·1602×135−12·0240= 9·6030	
		−1·70

FAROE BANK—BUTT OF LEWIS

F.R.S. *EXPLORER*
18-20 August, 1927

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
NNW. 2.			60°54′N 8°16′W			18.8.27
			176 m.			0345-0530
0	10·45	35·31	27·13	95		
10	·42	·30	·13	95	·0095	
20	·40	·29	·13	95	·0190	
30	·40	·26	·10	98	·0286	
40	·39	·31	·14	95	·0382	
60	·32	·29	·14	95	·0572	
80	9·97	·30	·21	89	·0756	
100	·73	·30	·25	86	·0931	
150	·54	·30	·28	84		
175	·51	·31	·29	83		
[200]				82	·1771	
[300]				74	·2551	
[400]				70	·3271	
[500]				70	·3971	
[550]				54	·4281	125·8010
NNE. 1/2.			60°35′N 8°00′W			18.8.27
			987 m.			1235-1740
0	12·55	35·33	26·75	131		
10	·36	·32	·78	128	·0130	
20	·16	·32	·82	125	·0256	
30	·16	·31	·81	126	·0382	
40	11·75	·34	·91	117	·0504	
60	10·85	·40	27·13	96	·0717	
80	·51	·40	·19	91	·0904	
100	·05	·41	·28	83	·1078	
200	9·21	·39	·40	73	·1858	
300	8·76	·33	·43	72	·2583	
400	·54	·33	·47	70	·3293	
500	·56	·32	·46	73	·4008	
[550]	6·24	·13	·65	54	·4326	129·4490
600	2·02	34·96	·96	19	·4508	
E. 2.			60°12′N 7°40′W			18-19.8.27
			804 m.			2115-0015
0	12·53	35·30	26·73	133		
10	·49	·39	·81	125	·0129	
20	·30	·29	·77	129	·0256	
30	·00	·32	·85	122	·0381	
40	11·48	·34	·97	111	·0497	
60	9·81	·42	27·33	77	·0685	
80	·51	·41	·37	74	·0836	
100	·30	·32	·34	77	·0987	
200	8·93	·34	·41	72	·1732	
300	·83	·38	·46	69	·2437	
400	·75	·41	·50	68	·3122	
500	5·68	·16	·75	43	·3677	
[550]	2·80	·01	·94	22	·3839	120·5605
600	0·20	34·92	28·05	8	·3914	
N. 2.			59°56′N 7°27′W			19.8.27
			664 m.			0255-0500
0	13·04	35·37	26·69	136		
10	·04	·39	·70	136	·0136	
20	12·64	·33	·73	133	·0270	
30	11·92	·35	·89	118	·0396	
40	·90	·36	·90	118	·0514	
60	10·31	·42	27·24	85	·0717	
80	9·78	·36	·28	82	·0884	
100	·65	·41	·35	76	·1042	
200	·07	·34	·39	74	·1792	
300	8·84	·33	·42	73	·2527	
400	·71	·32	·43	74	·3262	
500	·67	·35	·46	73	·3997	
[550]				73	·4362	127·7795
660	·39	·30	·47	75		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
NNE. 2.			59°31′N 7°05′W			19.8.27
			1030 m.			0830-1145
0	14·05	35·33	26·45	159		
10	·05	·34	·45	159	·0159	
20	·00	·36	·48	157	·0137	
30	13·73	·35	·53	152	·0471	
40	·12	·35	·65	141	·0617	
60	11·40	·36	27·00	108	·0866	
80	10·46	·40	·20	90	·1064	
100	·23	·36	·21	90	·1244	
200	9·05	·37	·42	71	·2049	
300	8·82	·31	·41	74	·2774	
400	·69	·36	·47	70	·3494	
500	·58	·27	·41	78	·4234	
[550]				76	·4619	139·6690
600	·42	·31	·47	74		
N. 1.			59°00′N 6°40′W			19.8.27
			150 m.			1610-1755
0	13·75	34·79	26·09	193		
10	·75	·79	·09	194	·0194	
20	·73	·82	·12	191	·0386	
30	·07	·95	·36	169	·0566	
40	12·50	35·16	·63	143	·0722	
[42·5]				138	·0757	1·6919
60	10·20	·19	27·08	101	·0966	
80	9·51	·26	·25	85	·1152	
100	·40	·33	·33	78	·1315	
[140]				79	·1629	13·6680
145	·40	·33	·33	79		
[200]				71	·2060	
[300]				74	·2785	
[400]				70	·3505	
[500]				78	·4245	
[550]				76	·4630	141·2675
N. 1.			58°40′N 6°10′W			19/20.8.27
			125 m.			2200-0030
0	13·60	34·65	26·02	200		
10	·50	·70	·08	195	·0198	
20	·11	·75	·19	184	·0388	
30	12·57	·79	·33	171	·0566	
40	11·88	·85	·51	155	·0729	
[42·5]				149	·0767	1·7035
60	10·15	35·08	27·00	108	·0992	
80	9·96	·13	·08	101	·1201	
[100]				93	·1395	
120	·43	·26	·27	84		
[140]				80	·1741	14·2985

VOLUME TRANSPORT

		Km³/hr.
60°54′N 8°16′W.	ΔQ=·4281×550 −125·8010=109·6540	
		+0·33
60°35′N 8°00′W.	ΔQ=·4326×550 −129·4490=108·4810	
		+5·08
60°12′N 7°40′W.	ΔQ=·3839×550 −120·5605= 90·5845	
		−6·14
59°56′N 7°27′W.	ΔQ=·4362×550 −127·7795=112·1305	
		−0·64
59°31′N 7°05′W.	ΔQ=·4619×550 −139·6690=114·3760	
		+0·28
59°00′N 6°40′W.	ΔQ=·4630×550 −141·2675=113·3825	
,,	ΔQ=·1629×140 − 13·6680= 9·1380	
		−0·27
58°40′N 6°10′W.	ΔQ=·1741×140 − 14·2985= 10·0755	
59°00′N 6°40′W.	ΔQ=·0757×42·5− 1·6919= 1·5254	
		−0·01*
58°40′N 6°10′W.	ΔQ=·0767×42·5− 1·7035= 1·5562	
		−1·35

*Since this is not by definition oceanic water (see Figure 9) but has been included as such in the preceding computation, it is treated in the aggregate as if its sign were positive instead of negative.

1929

SYDERØ, FAROE—PAPA STOUR, SHETLAND

F.R.S. *EXPLORER*
17-18 May, 1929

SSE. 2. 61°32½′N 6°28′W 18.5.29
127 m. 0910-1000

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	7·56	35·26	27·56	54		
10	·55	·26	·56	54	·0054	
20	·54	·26	·56	54	·0108	
30	·54	·25	·56	54	·0162	
40	·54	·25	·56	55	·0216	
60	·54	·20	·52	59	·0330	
80	·55	·19	·51	60	·0449	
[100]	·56	·20	·52	59	·0568	
120	·56	·21	·52	60	·0687	
[155]				57	·0892	6·7890

SE. 2-3. 61°28′N 6°06′W 18.5.29
184 m. 0620-0730

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	7·91	35·27	27·52	58		
10	·89	·28	·53	57	·0058	
20	·89	·27	·52	58	·0116	
30	·76	·28	·55	55	·0172	
40	·63	·28	·56	55	·0227	
60	·47	·26	·57	54	·0336	
80	·34	·26	·59	52	·0442	
100	·34	·26	·59	53	·0547	
130	·34	·27	·60	52		
[155]				53	·0839	6·6010
175	·34	·26	·59	54		
[190]				54	·1026	9·8648

SSE. 3. 61°17′N 5°24′W 18.5.29
196 m. 0245-0430

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·14	35·28	27·49	61		
10	·14	·30	·50	60	·0060	
20	·14	·29	·50	60	·0120	
30	·13	·28	·49	61	·0180	
40	7·87	·28	·53	58	·0240	
60	·75	·28	·55	56	·0354	
80	·67	·28	·56	55	·0465	
100	·63	·26	·55	57	·0577	
140	·54	·26	·56	56	·0803	
190	·00	·27	·65	49	·1065	10·3650
[200]				49	·1114	
[300]				42	·1569	
[400]				33	·1944	
[410]				32	·1976	44.3945

SSE. 2. 61°07′N 4°45′W 17.5.29
656 m. 2300-2345

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·11	35·33	27·38	71		
10	·11	·34	·39	70	·0070	
20	·10	·34	·39	70	·0140	
30	8·96	·34	·41	69	·0120	
40	·83	·34	·43	67	·0278	
60	·64	·34	·46	65	·0410	
80	·36	·37	·53	58	·0533	
100	·17	·35	·54	58	·0649	
200	7·70	·35	·61	53	·1204	
[300]	6·96	·22	·63	52	·1729	
400	4·70	·05	·77	39	·2184	
[410]				37	·2222	49·0700
[500]	1·86	34·90	·93	21		
600	–0·30	35·29	28·38	7		

SSE. 2-3. 61°02′N 4°22′W 17.5.29
1080 m. 1930-2140

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·02	35·34	27·40	69		
10	·02	·35	·41	68	·0068	
20	·01	·35	·41	69	·0136	
30	8·99	·35	·41	69	·0205	
40	·65	·35	·46	64	·0271	
60	·33	·35	·51	60	·0395	
80	·04	·30	·52	59	·0514	
100	7·95	·32	·55	57	·0630	
200	·51	·28	·58	56	·1195	
[300]	6·57	·19	·66	49	·1720	
[380]				31	·2040	42·0035
400	3·17	34·99	·89	26	·2095	
[410]				24	·2120	48·1460

SSE. 2. 60°57′N 4°03′W 17.5.29
1160 m. 1635-1805

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·23	35·34	27·36	73		
10	·23	·32	·35	74	·0074	
20	8·93	·32	·40	70	·0146	
30	·64	·31	·44	66	·0214	
40	·53	·32	·46	64	·0279	
60	·24	·33	·51	60	·0403	
80	·04	·32	·54	57	·0520	
100	7·84	·32	·56	56	·0633	
200	·06	·21	·59	54	·1183	
[300]	6·07	·07	·62	53	·1718	
[350]				36	·1940	36·0615
[380]				26	·2034	41·9245
400	2·29	34·97	·95	19		

ESE. 1-2. 60°47′N 3°23′W 17.5.29
ca.800 m. 1110-1345

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·13	35·34	27·38	71		
10	·12	·32	·37	72	·0072	
20	8·48	·31	·46	64	·0140	
30	·16	·30	·50	60	·0202	
40	·10	·32	·53	58	·0261	
60	7·98	·31	·54	57	·0376	
80	·73	·28	·55	56	·0489	
100	·66	·30	·58	54	·0599	
200	·15	·25	·61	53	·1134	
300	0·70	·26	28·30	–15	·1324	
[350]				–11	·1259	30·5470
[400]	–0·72	·00	·18	–6	·1219	
500	–0·91	34·88	·07	4	·1209	
[515]				4	·1215	50·7625

ESE. 2. 60°36′N 2°45′W 17.5.29
170 m. 0700-0845

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·59	35·41	27·36	73		
10	·33	·42	·41	68	·0070	
20	·29	·41	·41	69	·0138	
30	·26	·41	·41	69	·0207	
40	·26	·40	·41	69	·0276	
60	·21	·41	·42	68	·0413	
80	·04	·40	·44	67	·0548	
100	·02	·40	·44	67	·0682	
[140]				65	·0946	6·6890
150	8·93	·41	·47	65		
168	·93	·41	·47	66		
[200]				65	·1336	
[300]				65	·1986	
[400]				56	·2591	
[500]				41	·3076	
[515]				39	·3136	86·0240

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
ESE. 1.			60°27′N 2°06′W			17.5.29
			114 m.			0320-0415
0	9·30	35·34	27·35	74		
10	8·95	·34	·41	68	·0071	
20	·94	·29	·37	72	·0141	
30	·93	·28	·37	73	·0213	
40	·86	·34	·42	68	·0283	
60	·70	·36	·47	64	·0415	
80	·46	·34	·49	62	·0541	
110	·28	·35	·53	59	·0723	
[140]				62	·0905	6·5585

VOLUME TRANSPORT

		Km^3/hr
61°32½′N 6°28′W.	ΔQ=·0892×155− 6·7890= 7·0370	+ 0·18
61°28′N 6°06′W.	ΔQ=·0839×155− 6·6010= 6·4035	
,,	ΔQ=·1026×190− 9·8648= 9·6292	− 0·07
61°17′N 5°24′W.	ΔQ=·1065×190−10·3650= 9·8700	
,,	ΔQ=·1976×410−44·3945=36·6215	− 1·52
61°07′N 4°45′W.	ΔQ=·2222×410−49·0700=42·0320	
61°02′N 4°22′W.	ΔQ=·2120×410−48·1460=38·7740	+ 0·92
,,	ΔQ=·2040×380−42·0035=35·5165	+ 0·04
60°57′N 4°03′W.	ΔQ=·2034×380−41·9245=35·3675	
,,	ΔQ=·1940×350−36·0615=31·8385	+ 5·18
60°47′N 3°23′W.	ΔQ=·1259×350−30·5470=13·5180	
,,	ΔQ=·1215×515−50·7625=11·8100	−18·02
60°36′N 2°45′W.	ΔQ=·3136×515−86·0240=75·4800	
,,	ΔQ=·0946×140− 6·6890= 6·5550	+ 0·13
60°27′N 2°06′W.	ΔQ=·0905×140− 6·5585= 6·1115	
		−13·16

FAROE BANK—BUTT OF LEWIS

F.R.S. *EXPLORER*

28-29 May, 1929

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
NNW. 1.			60°54′N 8°16′W			28.5.29
			142 m.			0045-0430
0	9·52	35·35	27·32	77		
10	·43	·35	·34	75	·0076	
20	·06	·36	·41	69	·0148	
30	8·80	·35	·44	66	·0216	
40	·69	·35	·46	64	·0281	
60	·50	·35	·49	62	·0407	
80	·48	·36	·50	61	·0510	
100	·44	·35	·50	62	·0613	
135	·38	·35	·51	61		
[200]				60	·1223	
[300]				51	·1778	
[400]				38	·2223	
[500]				31	·2568	
[550]				28	·2716	82·5135
Var. 0-1.			60°35′N 8°00′W			28.5.29
			946 m.			0640-0750
0	9·68	35·34	27·29	80		
10	·65	·36	·31	78	·0079	
20	·45	·37	·35	74	·0155	
30	·39	·35	·35	74	·0229	
40	·34	·35	·35	75	·0303	
60	·09	·35	·39	71	·0449	
80	·01	·36	·42	69	·0589	
100	8·93	·36	·43	68	·0726	
200	·67	·35	·46	67	·1401	
300	7·39	·30	·62	53	·2001	
[400]	1·67	·03	28·04	10	·2316	
500	−0·54	34·92	·09	3	·2381	
[550]				3	·2396	88·3770
E. 1.			60°12′N 7°40′W			28.5.29
			570 m.			1100-1235
0	10·11	35·39	27·26	82		
10	9·80	·39	·31	78	·0080	
20	·77	·39	·32	77	·0158	
30	·74	·38	·31	78	·0236	
40	·71	·37	·31	79	·0314	
60	·55	·37	·33	77	·0470	
80	·54	·39	·35	76	·0623	
100	·53	·39	·35	76	·0775	
200	8·91	·38	·45	68	·1495	
[300]	·76	·36	·46	69	·2180	
350	·75	·36	·46	70		
[400]	·70	·35	·46	71	·2880	
[500]	·33	·30	·48	71	·3590	
550	7·99	·27	·50	70	·3942	110·1110
E. 2-3.			59°56′N 7°27′W			28.5.29
			725 m.			1430-1520
0	10·16	35·39	27·25	83		
10	·10	·37	·24	84	·0084	
20	9·83	·39	·30	79	·0166	
30	·56	·38	·34	75	′0243	
40	·32	·40	·39	71	·0316	
60	·16	·39	·42	68	·0455	
80	·09	·39	·43	68	·0591	
100	·04	·38	·43	68	·0727	
200	8·91	·38	·45	68	·1407	
300	·87	·36	·44	71	·2102	
[400]	·80	·36	·45	72	·2817	
500	·51	·36	·49	69	·3522	
[550]	7·93	·37	·59	61	·3847	106·7135
E. 2-3.			59°44′N 7°15′W			28.5.29
			1085 m.			1700-1915
0	10·60	35·38	27·16	92		
10	·58	·39	·17	91	·0092	
20	·18	·40	·25	84	·0180	
30	·12	·37	·24	85	·0264	
40	9·87	·38	·29	80	·0346	
60	·69	·39	·33	77	·0503	
80	·46	·40	·37	74	·0654	
100	·26	·39	·40	71	·0799	
200	·02	·36	·42	71	·1509	
400	8·97	·36	·42	75	·2969	
[500]				76	·3724	
[550]				77	·4106	113·5280
E. 1-2.			59°31′N 7°05′W			28.5.29
			980 m.			2050-2150
0	10·65	35·42	27·18	90		
10	·64	·41	·18	90	·0090	
20	·61	·42	·19	90	·0180	
30	·45	·43	·23	86	·0268	
40	·08	·42	·28	81	·0352	
60	9·95	·42	·31	79	·0512	
80	·34	·40	·39	72	·0663	
100	·09	·40	·44	67	·0802	
200	·11	·39	·42	71	·1492	
[300]				72	·2207	
[350]				73	·2569	46·1230
400	·01	·38	·43	74	·2942*	
[500]				75	·3687	
[550]				76	·4065	112·4530

*This summation is from the original table with the interval of observations from 200 m. to 400 m.

E. 2-3. 59°17′N 6°53′W 162 m. 28/29.5.29 2325-0030

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·17	35·46	27·12	96		
10	10·88	·46	·17	91	·0094	
20	·64	·46	·21	88	·0184	
30	·33	·45	·26	83	·0270	
40	·23	·46	·29	80	·0352	
60	9·92	·45	·33	77	·0509	
80	·93	·46	·34	77	·0663	
100	·89	·45	·34	77	·0817	
150	·65	·44	·37	75	·1197	
[155]				75	·1235	9·8800
[200]				75	·1573	
[300]				75	·2323	
[350]				76	·2701	48·2270

E. 2-3. 59°00′N 6°40′W 145 m. 29.5.29 0205-0310

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·16	35·44	27·11	97		
10	·16	·43	·10	98	·0098	
20	10·97	·44	·14	94	·0194	
30	·74	·43	·17	92	·0287	
40	·54	·46	·23	86	·0376	
60	9·98	·46	·33	77	·0539	
80	·82	·45	·36	75	·0691	
100	·74	·46	·37	74	·0840	
[130]				73	·1060	7·2930
140	·49	·44	·40	72		
[155]				72	·1241	10·1658

ENE. 4. 58°40′N 6°10′W 118 m. 29.5.29 2000-2130

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·33	34·70	26·68	137		
10	·06	·84	·83	123	·0130	
20	9·70	·88	·92	115	·0249	
30	·56	·93	·99	109	·0361	
40	·50	·95	27·01	107	·0469	
60	·37	35·17	·21	88	·0664	
80	·00	·26	·34	76	·0828	
[100]				77	·0981	
108	8·98	·26	·34	77		
[130]				76	·1211	8·6965

VOLUME TRANSPORT

		Km³/hr
60°54′N 8°16′W.	ΔQ=·2716 × 550 − 84·6635 = 64·7165	+ 6·03
60°35′N 8°00′W.	ΔQ=·2396 × 550 − 88·3770 = 43·4030	−17·97
60°12′N 7°40′W.	ΔQ=·3942 × 550 − 110·1110 = 106·6990	+ 0·52
59°56′N 7°27′W.	ΔQ=·3847 × 550 − 106·7135 = 104·8715	− 2·12
59°44′N 7°15′W.	ΔQ=·4106 × 550 − 113·5280 = 112·3020	+ 0·34
59°31′N 7°05′W.	ΔQ=·4065 × 550 − 112·4530 = 111·1220	
,,	ΔQ=·2569 × 350 − 46·1230 = 43·7920	− 0·72
59°17′N 6°53′W.	ΔQ=·2701 × 350 − 48·2270 = 46·3080	
,,	ΔQ=·1235 × 155 − 9·8800 = 9·2625	+ 0·06
59°00′N 6°40′W.	ΔQ=·1241 × 155 − 10·1658 = 9·0697	
,,	ΔA=·1060 × 130 − 7·2930 = 6·4870	− 0·16
58°40′N 6°10′W.	ΔQ=·1211 × 130 − 8·6965 = 7·0465	
		−14·02

NOLSØ, FAROE—FLUGGA, SHETLAND
F.R.S. *EXPLORER*
22-24 June, 1929

NE/N. 5. 61°54′N 5°45′W 304 m. 24.6.29 0200-0315

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·18	35·41	27·43	66		
10	·18	·26	·31	78	·0072	
20	·18	·26	·31	78	·0150	
30	·18	·28	·32	77	·0228	
40	·17	·28	·33	77	·0305	
60	8·94	·29	·37	73	·0455	
80	·43	·30	·46	65	·0593	
100	7·99	·30	·53	59	·0717	
200	·52	·30	·61	53	·1277	
[240]				54	·1491	19·2265
300	·56	·31	·61	55		

N/E. 2. 61°49′N 5°21′W 175 m. 23/24.6.29 2245-0055

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·83	35·20	27·15	93		
10	·83	·26	·20	88	·0090	
20	·83	·26	·20	88	·0178	
30	·73	·27	·22	87	·0266	
40	·63	·29	·26	83	·0351	
60	8·70	·28	·40	70	·0504	
80	7·83	·27	·54	57	·0631	
100	·62	·26	·56	56	·0744	
170	·60	·28	·57	56		
[200]				55	·1299	
[205]				55	·1327	14·9460
[240]				51	·1511	19·9095

N. 4. 61°42′N 4°51′W 238 m. 23.6.29 1920-2115

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·33	35·27	27·29	80		
10	·33	·26	·28	81	·0080	
20	·22	·26	·30	79	·0160	
30	·21	·27	·31	78	·0238	
40	·10	·28	·34	76	·0315	
60	8·73	·28	·40	70	·0461	
80	·32	·35	·51	60	·0591	
100	·11	·31	·52	60	·0711	
[200]	7·71	·29	·56	57	·1296	
[205]				57	·1324	14·4555
230	7·67	·29	·58	56		
[300]				49	·1826	
[400]				42	·2281	
[420]				40	·2363	54·7845

N. 2. 61°35′N 4°15′W 670 m. 23.6.29 1500-1715

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·38	35·35	27·18	90		
10	·38	·35	·18	90	·0090	
20	·21	·36	·21	88	·0179	
30	·20	·35	·21	88	·0267	
40	·10	·35	·22	87	·0355	
60	9·15	·36	·39	71	·0513	
80	8·92	·35	·42	69	·0653	
100	·84	·37	·45	66	·0788	
200	·10	·31	·52	61	·1423	
[300]	6.67	·21	·66	49	·1973	
400	5·26	·09	·74	42	·2428	
[420]				39	·2509	59·1655
[485]				30	·2734	76·1670
[500]	3·67	34·98	·84	28		

NNE. 4. 61°28′N 3°42′W 23.6.29
1254 m. 0930-1245

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·33	35·25	27·10	98		
10	·33	·38	·21	87	·0092	
20	·25	·35	·20	88	·0180	
30	·25	·35	·20	89	·0268	
40	·20	·35	·21	88	·0356	
60	8·76	·35	·45	66	·0510	
80	·56	·36	·49	62	·0638	
100	·40	·36	·51	61	·0761	
200	7·59	·35	·64	50	·1316	
[300]	6·72	·30	·72	44	·1786	
400	5·30	·19	·82	35	·2181	
[475]				22	·2395	67·0210
[485]				20	·2415	69·3940
500	1·85	34·97	·98	17		

NE. 3. 61°21′N 3°10′W 23.6.29
1442 m. 0420-0745

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·07	35·36	27·24	84		
10	·07	·35	·23	85	·0084	
20	·07	·35	·23	86	·0170	
30	·07	·36	·24	85	·0256	
40	·04	·35	·23	86	·0342	
60	9·56	·38	·34	76	·0504	
80	8·90	·35	·42	69	·0649	
100	·62	·35	·47	64	·0782	
200	7·82	·35	·60	54	·1372	
[300]	6·71	·26	·69	46	·1872	
400	4·68	·08	·79	37	·2287	
[475]				22	·2508	69·8772
[500]	1·82	34·95	·98	17	·2557	
[525]				15	·2597	82·5585

SE. 4. 61°14′N 2°40′W 22/23.6.29
1142 m. 2330-0215

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·68	35·44	27·19	89		
10	·66	·43	·19	89	·0089	
20	·35	·41	·23	86	·0177	
30	·24	·39	·23	86	·0263	
40	·05	·40	·27	82	·0347	
60	9·68	·39	·33	77	·0506	
80	·45	·36	·34	77	·0660	
100	·42	·42	·40	71	·0808	
200	8·47	·38	·52	62	·1473	
[300]	7·84	·34	·59	57	·2068	
400	·34	·29	·63	54	·6623	
500	6·67	·21	·66	53	·3158	
[525]				42	·3277	93·7033
600	0·65	34·93	28·03	10	·3473	
[625]				8	·3495	127·5245

S. 2. 61°08′N 2°10′W 22.6.29
624 m. 1945-2200

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·88	35·41	27·13	95		
10	·87	·41	·14	94	·0094	
20	·63	·43	·19	90	·0186	
30	·60	·41	·18	91	·0276	
40	·49	·43	·22	87	·0365	
60	·03	·47	·33	87	·0539	
80	9·91	·47	·35	85	·0711	
100	·86	·47	·36	85	·0881	
200	·59	·47	·41	72	·1666	
[300]	·13	·42	·46	70	·2376	
[390]				70	·3006	61·6485
400	8·61	·35	·47	70	·3076	
[500]	7·47	·25	·58	61	·3731	
600	5·06	·14	·80	39	·4231	
[625]				23	·4309	149·2095

Var. 1. 61°01′N 1°36′W 22.6.29
158 m. 1600-1800

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·23	35·41	27·07	100		
10	10·68	·41	·17	91	·0096	
20	·64	·40	·17	91	·0187	
30	·62	·40	·17	92	·0279	
40	·61	·40	·17	92	·0371	
60	·48	·43	·22	88	·0551	
80	·13	·44	·29	81	·0720	
100	9·59	·43	·37	74	·0875	
[140]				69	·1161	8·6075
155	9·05	·42	·46	67		
[200]				69	·1575	
[300]				70	·2270	
[390]				70	·2900	59·2755

NNE. 1. 60°57′N 1°02′W 22.6.29
117 m. 1225-1400

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·41	35·45	27·07	100		
10	·03	·44	·13	95	·0098	
20	10·95	·45	·15	93	·0192	
30	·94	·44	·15	94	·0286	
40	·93	·44	·15	94	·0380	
60	·08	·44	·30	80	·0554	
80	9·27	·44	·44	67	·0701	
110	8·85	·37	·45	67	·0902	
[140]				67	·1103	8·3670

VOLUME TRANSPORT

		Km³/hr
61°54′N 5°45′W.	ΔQ = ·1491 × 240 − 19·2265 = 16·5575	+ 0·06
61°49′N 5°21′W.	ΔQ = ·1511 × 240 − 19·9095 = 16·3545	
”	ΔQ = ·1327 × 205 − 14·9460 = 12·2575	− 0·12
61°42′N 4°51′W.	ΔQ = ·1324 × 205 − 14·4555 = 12·6865	
”	ΔQ = ·2363 × 420 − 54·7845 = 44·4615	− 0·49
61°35′N 4°15′W.	ΔQ = ·2509 × 420 − 59·1655 = 46·2125	
”	ΔQ = ·2734 × 485 − 76·1670 = 56·4320	+ 2.44
61°28′N 3°42′W.	ΔQ = ·2415 × 485 − 69·3940 = 47·7335	
”	ΔQ = ·2395 × 475 − 67·0210 = 46·7415	− 0·71
61°21′N 3°10′W.	ΔQ = ·2508 × 475 − 69·8772 = 49·2528	
”	ΔQ = ·2597 × 525 − 82·5585 = 53·7840	− 6.91
61°14′N 2°40′W.	ΔQ = ·3277 × 525 − 93·7033 = 78·3392	
”	ΔQ = ·3495 × 625 − 127·5245 = 90·8930	− 8·23
61°08′N 2°10′W.	ΔQ = ·4309 × 625 − 149·2095 = 120·1030	
”	ΔQ = ·3006 × 390 − 61·6485 = 55·5855	+ 0·50
61°01′N 1°36′W.	ΔQ = ·2900 × 390 − 59·2755 = 53·8245	
”	ΔQ = ·1161 × 140 − 8·6075 = 7·6465	+ 0·16
60°57′N 1°02′W.	ΔQ = ·1103 × 140 − 8·3670 = 7·0750	
		−13·30

1931

SYDERØ, FAROE—PAPA STOUR, SHETLAND

F.R.S. *EXPLORER*
16-18 May, 1931

NE. 2. 61°32′N 6°28′W 18.5.31
109 m. 0130-0345

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	7·12	35·28	27·65	45		
10	·12	·23	·61	49	·0047	
20	·13	·22	·60	50	·0097	
30	·13	·22	·60	51	·0147	
40	·13	·29	·65	46	·0195	
60	·14	·22	·60	51	·0292	
80	·14	·22	·60	51	·0394	
105	·14	·22	·60	52	·0523	
[150]				51	·0755	5·5832

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
NE. 2.			61°28′N 6°06′W			17.5.31
			187 m.			2230-2350
0	7·67	35·19	27·50	60		
10	·67	·18	·50	60	·0060	
20	·67	·19	·50	60	·0120	
30	·67	·19	·50	60	·0180	
40	·67	·19	·50	60	·0240	
60	·68	·26	·55	56	·0356	
80	·40	·25	·59	52	·0464	
100	·13	·20	·59	53	·0569	
[150]				47	·0819	6·3990
180	6·49	·22	·69	44		
[190]				44	·1001	10·0390
NE. 4.			61°17′N 5°24′W			17.5.31
			196 m.			1915-1945
0	8·80	35·29	27·39	70		
10	·80	·31	·41	68	·0069	
20	·73	·29	·40	70	·0138	
30	7·86	·25	·52	58	·0202	
40	·61	·28	·58	53	·0258	
60	6·84	·27	·67	44	·0355	
80	7·02	·25	·64	48	·0447	
100	6·34	·24	·72	40	·0535	
190	5·74	·15	·73	40	·0895	9·3700
[240]				32	·1075	14·2950
NE. 4.			61°07′N 4°45′W			17.5.31
			660 m.			1445-1620
0	8·02	35·27	27·50	60		
10	·02	·24	·47	63	·0062	
20	7·99	·29	·52	58	·0122	
30	·86	·32	·57	54	·0178	
40	·57	·32	·62	49	·0230	
60	·37	·33	·66	46	·0325	
80	·23	·26	·62	50	·0421	
100	·01	·26	·64	48	·0519	
200	4·84	·10	·78	35	·0934	
[240]				38	·1070	13·9910
[300]	3·16	34·95	·85	29	·1254	
[320]				27	·1310	23.4870
NE. 4.			61°02′N 4°22′W			17.5.31
			1076 m.			1100-1245
0	8·81	35·31	27·41	68		
10	9·76	·35	·28	81	·0074	
20	·76	·35	·28	81	·0155	
30	8·79	·35	·44	66	·0229	
40	·71	·35	·45	65	·0295	
60	·23	·31	·50	61	·0421	
80	7·67	·29	·58	53	·0535	
100	·64	·46	·72	41	·0629	
200	6·69	·28	·71	43	·1049	
[300]	4·87	·09	·78	37	·1449	
[320]				34	·1520	27·2905
400	2·71	34·96	·90	24	·1754	
[500]				17	·1959	
[510]				16	·1975	60·8685
N. 4.			60°57′N 4°03′W			17.5.31
			1121 m.			0600-0900
0	8·90	35·35	27·43	66		
10	·91	·36	·43	66	·0066	
20	·91	·37	·44	66	·0132	
30	·89	·36	·44	66	·0198	
40	·49	·36	·50	60	·0261	
60	·30	·34	·51	60	·0381	
80	·13	·37	·56	56	·0497	
100	·04	·34	·56	56	·0609	
200	7·14	·26	·63	51	·1144	
[300]	6·27	·21	·70	45	·1624	
400	5·43	·17	·78	38	·2039	
[485]				31	·2332	62·6493
[500]	3·94	·06	·86	30	·2379	
[510]				28	·2408	68·5560

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
N. 1.			60°47′N 3°23′W			17.5.31
			720 m.			0115-0240
0	8·91	35·35	27·42	67		
10	·83	·37	·45	65	·0066	
20	·80	·39	·47	63	·0130	
30	·66	·37	·48	62	·0192	
40	·55	·37	·49	61	·0254	
60	·55	·37	·50	61	·0376	
80	·37	·35	·51	60	·0497	
100	·27	·35	·53	59	·0616	
200	6·87	·27	·67	47	·1146	
300	5·24	·12	·76	39	·1576	
[340]				35	·1724	32·1510
[400]	3·45	·01	·87	28	·1911	
[485]				17	·2102	60·0412
NW. 1.			60°36′N 2°45′W			16.5.31
			176 m.			2045-2200
0	9·50	35·35	27·33	76		
10	·36	·39	·38	71	·0074	
20	·11	·39	·42	68	·0144	
30	·02	·38	·43	67	·0212	
40	8·80	·39	·47	63	·0277	
60	·50	·39	·52	59	·0399	
80	·52	·38	·51	60	·0518	
100	·22	·37	·54	58	·0636	
[145]				53	·0886	6·7400
170	7·49	·32	·63	50		
[200]				45	·1151	
[300]				38	·1566	
[340]				33	·1708	32·5835
SW. 2.			60°27′N 2°06′W			16.5.31
			111 m.			1645-1750
0	9·48	35·32	27·31	78		
10	·12	·31	·36	73	·0076	
20	8·92	·34	·41	69	·0147	
30	·83	·37	·45	65	·0214	
40	·66	·35	·46	64	·0278	
60	7·66	·38	·65	46	·0388	
80	·27	·35	·68	44	·0478	
[100]				43	·0565	
108	·25	·37	·70	43		
[145]				49	·0772	6·1548

Volume Transport

		Km^3/hr
61°32′N 6°28′W.	$\Delta Q = ·0755 \times 150 - 5·5832 = 5·7418$	− 0·04
61°28′N 6°06′W.	$\Delta Q = ·0819 \times 150 - 6·3990 = 5·8860$	
,,	$\Delta Q = ·1001 \times 190 - 10·0390 = 8·9800$	− 0·18
61°17′N 5°24′W.	$\Delta Q = ·0895 \times 190 - 9·3700 = 9·6350$	
,,	$\Delta Q = ·1075 \times 240 - 14·2950 = 11·5050$	− 0·04
61°07′N 4°45′W.	$\Delta Q = ·1070 \times 240 - 13·9910 = 11·6890$	
,,	$\Delta Q = ·1310 \times 320 - 23·4870 = 18·4330$	− 0·90
61°02′N 4°22′W.	$\Delta Q = ·1520 \times 320 - 27·2905 = 21·3495$	
,,	$\Delta Q = ·1975 \times 510 - 60·8685 = 39·8565$	− 4·06
60°57′N 4°03′W.	$\Delta Q = ·2408 \times 510 - 68·5560 = 54·2520$	
,,	$\Delta Q = ·2332 \times 485 - 62·6493 = 50·4527$	+ 2·41
60°47′N 3°23′W.	$\Delta Q = ·2102 \times 485 - 60·0412 = 41·9058$	
,,	$\Delta Q = ·1724 \times 340 - 32·1510 = 26·4650$	+ 0·28
60°36′N 2°45′W.	$\Delta Q = ·1708 \times 340 - 32·5835 = 25·4885$	
,,	$\Delta Q = ·0886 \times 145 - 6·7400 = 6·1070$	+ 0·30
60°27′N 2°06′W.	$\Delta Q = ·0772 \times 145 - 6·1548 = 5·0392$	
		− 2·23

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m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
SSW. 3.			60°54′N 8°16′W			27.5.31
			133 m.			0330-0530
0	9·09	35·35	27·40	69		
10	·08	·33	·38	71	·0070	
20	8·84	·32	·41	69	·0140	
30	·59	·35	·47	63	·0206	
40	·32	·35	·52	58	·0266	
60	·24	·35	·53	58	·0382	
80	·21	·35	·53	58	·0498	
100	·19	·35	·54	58	·0614	
130	·19	·35	·54	58	·0788	
[200]				64	·1224	
[300]				66	·1874	
[400]				67	·2539	
[500]				64	·3194	
[550]				56	·3494	95·2590
SSW. 2.			60°35′N 8°00′W			27.5.31
			850 m.			1100-1510
0	9·82	35·39	27·30	79		
10	·64	·40	·34	75	·0077	
20	·49	·38	·35	74	·0151	
30	·46	·39	·36	74	·0225	
40	·13	·37	·40	70	·0297	
60	8·76	·38	·47	64	·0431	
80	·67	·39	·50	61	·0556	
100	·62	·37	·48	64	·0681	
200	·41	·35	·50	63	·1316	
[300]	·40	·35	·50	65	·1956	
400	·38	·35	·51	66	·2611	
[500]	7·33	·25	·60	59	·3236	
[550]	5·32	·15	·78	40	·3484	98·7685
SE. 3.			60°12′N 7°40′W			27.5.31
			510 m.			1800-1840
0	10·03	35·35	27·24	84		
10	9·53	·57	·49	61	·0072	
20	·34	·40	·39	70	·0138	
30	·26	·38	·39	71	·0208	
40	·19	·39	·41	69	·0278	
60	·02	·39	·44	67	·0414	
80	·02	·39	·44	67	·0548	
100	8·79	·37	·46	66	·0681	
200	·58	·38	·50	63	·1326	
300	·48	·38	·52	64	·1961	
[400]	7·72	·37	·64	54	·2551	
500	6·31	·35	·82	37	·3006	
[550]				30	·3174	95·7050
E/S. 2.			59°56′N 7°27′W			27.5.31
			560 m.			2100-2245
0	10·24	35·38	27·22	86		
10	·15	·36	·22	86	·0086	
20	9·51	·38	·35	74	·0166	
30	·41	·41	·38	72	·0239	
40	·36	·39	·38	72	·0311	
60	·22	·39	·40	70	·0453	
80	·18	·39	·41	70	·0593	
100	·12	·64	·62	50	·0713	
200	·26	·36	·37	76	·1373	
300	8·63	·37	·48	67	·2088	
[400]	·19	·35	·54	63	·2738	
[500]	7·96	·32	·55	64	·3373	
550	·85	·30	·54	66	·3698	103·8600

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
E/S. 3.			59°44′N 7°15′W			28.5.31
			550 m.			0100-0150
0	9·26	35·35	27·37	72		
10	·19	·38	·40	69	·0070	
20	·44	·35	·33	76	·0142	
30	·26	·37	·38	72	·0216	
40	·20	·37	·39	71	·0288	
60	·01	·36	·42	68	·0427	
80	8·90	·36	·43	63	·0563	
100	·79	·32	·42	69	·0700	
200	·50	·31	·46	67	·1380	
300	·41	·31	·47	68	·2055	
[400]	·30	·31	·49	68	·2735	
[500]	·14	·31	·51	68	·3415	
540	·05	·30	·52	68		
[550]	·03	·30	·52	68	·3755	103·7550
E. 4.			59°31′N 7°05′W			28.5.31
			1070 m.			0400-0800
0	10·01	35·33	27·22	86		
10	·01	·40	·28	81	·0084	
20	9·87	·38	·29	80	·0164	
30	·53	·37	·34	75	·0242	
40	·44	·39	·37	73	·0316	
60	·25	·39	·40	70	·0459	
80	·12	·39	·42	69	·0598	
100	·02	·36	·42	69	·0736	
200	8·81	·36	·45	68	·1421	
[300]	·68	·36	·47	68	·2101	
400	·56	·37	·49	68	·2781	
[500]	·47	·37	·51	68	·3461	
[550]	·42	·37	·52	68	·3801	105·9840
ESE. 5.			59°17′N 6°53′W			28.5.31
			700 m.			1000-1120
0	10·57	35·38	27·17	91		
10	·54	·38	·17	91	·0091	
20	·51	·41	·20	89	·0181	
30	·38	·39	·21	88	·0269	
40	9·99	·40	·28	81	·0353	
60	·81	·36	·28	82	·0516	
80	·59	·38	·34	77	·0675	
100	·59	·38	·34	77	·0829	
200	·20	·39	·41	72	·1574	
300	8·82	·35	·44	71	·2289	
[355]	·75	·36	·46	71	·2679	49·2735
[400]	·72	·38	·48	69	·2989	
500	·69	·39	·49	70	·3684	
[550]	·70	·39	·49	71	·4036	114·6665
E. 5.			59°00′N 6°40′W			28.5.31
			162 m.			1500-1600
0	10·29	35·32	27·17	91		
10	·26	·35	·20	88	·0090	
20	9·93	·32	·23	86	·0177	
30	·64	·33	·29	80	·0260	
40	·65	·37	·32	78	·0339	
60	·23	·37	·39	71	·0488	
80	8·92	·39	·45	66	·0625	
100	·71	·37	·47	64	·0755	
[140]				66	·1015	7·5565
160	·67	·33	·45	67		
[200]				69	·1420	
[300]				70	·2115	
[355]				70	·2500	45·2577

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
ENE. 6.			58°40′N 6°10′W			28.5.31
			113 m.			2115-2300
0	9·64	34·90	26·95	112		
10	·65	·94	·98	109	·0110	
20	·58	·94	·99	108	·0218	
30	·10	·95	27·08	100	·0322	
40	·00	·94	·09	99	·0422	
60	8·30	35·08	·31	79	·0600	
80	·12	·16	·40	71	·0750	
100	·11	·11	·36	75	·0896	
[140]				71	·1188	9·0470

Volume Transport

		Km³/hr
60°54′N 8°16′W.	ΔQ=·3494×550− 95·2590= 96·9100	
		+1·15
60°35′N 8°00′W.	ΔQ=·3484×550− 98·7685= 92·8515	
		+3·97
60°12′N 7°40′W.	ΔQ=·3174×550− 95·7050= 78·8650	
		−5·81
59°56′N 7°27′W.	ΔQ=·3698×550−103·8600= 99·5300	
		−0·92
59°44′N 7°15′W.	ΔQ=·3755×550−103·7550=102·7700	
		−0·08
59°31′N 7°05′W.	ΔQ=·3801×550−105·9840=103·0710	
		−1·21
59°17′N 6°53′W.	ΔQ=·4036×550−114·6665=107·3135	
,,	ΔQ=·2679×355− 49·2735= 45·8310	
		+0·67
59°00′N 6°40′W.	ΔQ=·2500×355− 45·2577= 43·4923	
,,	ΔQ=·1015×140− 7·5565= 6·6535	
		−0·27
58°40′N 6°10′W.	ΔQ=·1188×140− 9·0470= 7·5850	
		−2·50

1933

SYDERØ, FAROE—PAPA STOUR, SHETLAND

F.R.S. *EXPLORER*

9-11 June, 1933

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
NE. 1.			61°32′N 6°28′W			11.6.33
			153 m.			0300-0415
0	9·52	35·22	27·22	86		
10	8·59	·23	·38	71	·0078	
20	·46	·23	·40	70	·0148	
30	·41	·24	·42	68	·0217	
40	·26	·22	·43	67	·0285	
60	·11	·21	·44	66	·0418	
80	·10	·22	·45	66	·0550	
100	·06	·22	·46	65	·0681	
150	7·85	·22	·50	62	·0999	
[185]				57	·1207	11·5115
NE.1.			61°28′N 6°06′W			11.6.33
			218 m.			0015-0100
0	10·85	35·30	27·06	101		
10	·70	·31	·09	99	·0100	
20	·21	·32	·18	90	·0194	
30	9·37	·31	·32	77	·0278	
40	8·69	·29	·41	69	·0351	
60	7·88	·29	·54	57	·0477	
80	·54	·25	·55	56	·0590	
100	·10	·21	·59	53	·0699	
[185]				52	·1145	11·7685
[210]				52	·1275	14·7935
215	·00	·22	·62	52		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
NE. 1.			61°17′N 5°24′W			10.6.33
			203 m.			2045-2200
0	10·69	35·30	27·08	99		
10	9·56	·29	·27	82	·0090	
20	·25	·30	·33	76	·0169	
30	8·77	·29	·40	70	·0242	
40	·56	·32	·45	65	·0310	
60	·19	·30	·50	61	·0436	
80	7·89	·28	·53	58	·0555	
100	·51	·26	·57	55	·0668	
200	6·89	·21	·62	52	·1203	
[210]				52	·1255	14·2000
[300]				46	·1693	
[400]				39	·2118	46·5060
E. 1.			61°07′N 4°45′W			10.6.33
			715 m.			1615-1830
0	10·88	35·30	27·05	102		
10	·08	·30	·19	89	·0096	
20	9·78	·30	·24	85	·0183	
30	·25	·32	·35	74	·0263	
40	8·89	·32	·41	69	·0335	
60	·39	·33	·49	62	·0466	
80	·21	·32	·51	60	·0588	
100	·07	·30	·52	60	·0708	
200	7·31	·27	·61	53	·1273	
300	6·73	·21	·65	50	·1788	
[395]				44	·2234	48·1750
400	5·35	·08	·72	44	·2258	
[465]				34	·2512	64·8030
500	2·77	34·91	·87	28		
Var. 1.			61°02′N 4°22′W			10.6.33
			1070 m.			1200-1515
0	11·49	35·40	27·01	106		
10	·38	·41	·04	103	·0104	
20	10·60	·39	·17	91	·0201	
30	9·76	·44	·35	74	·0283	
40	·60	·44	·38	72	·0356	
60	·19	·40	·42	68	·0496	
80	·12	·38	·41	70	·0634	
100	8·47	·38	·52	60	·0764	
200	·11	·30	·51	62	·1374	
300	7·39	·26	·59	56	·1964	
400	6·01	·14	·69	47	·2479	
[420]				43	·2569	58·7890
[465]				35	·2745	70·7190
500	2·97	34·94	·87	28		
NNW. 2.			60°57′N 4°03′W			10.6.33
			1143 m.			0600-1040
0	11·02	35·38	27·08	99		
10	10·99	·37	·08	100	·0100	
20	9·81	·38	·30	79	·0190	
30	·39	·42	·40	70	·0264	
40	·19	·37	·40	70	·0334	
60	8·93	·36	·43	67	·0471	
80	·85	·38	·46	65	·0603	
100	·76	·37	·46	66	·0734	
200	·04	·31	·53	60	·1364	
300	7·47	·12	·46	69	·2009	
[380]				63	·2537	49·4760
400	5·80	34·92	·54	61	·2659	
[420]				53	·2773	60·0640

NW. 3. 60°47′N 3°23′W, 725 m. 10.6.33, 0045-0245

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	11·47	35·38	27·00	107		
10	·15	·33	·02	105	·0106	
20	10·76	·34	·10	98	·0208	
30	9·90	·48	·36	74	·0294	
40	·11	·33	·38	72	·0367	
60	8·31	·31	·49	62	·0501	
80	·00	·29	·52	59	·0622	
100	·89	·30	·54	59	·0740	
200	·09	·23	·62	52	·1295	
300	5·76	·12	·70	45	·1780	
[380]				34	·2096	45·1985
[395]				32	·2146	48·3430
[400]	3·90	·01	·84	31		
500	1·75	34·94	·97	17		

NNW. 2. 60°36′N 2°45′W, 188 m. 9.6.33, 2025-2130

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	12·00	35·43	26·94	113		
10	11·30	·43	27·07	101	·0107	
20	10·53	·43	·21	88	·0201	
30	·53	·47	·24	85	·0287	
40	9·83	·43	·33	77	·0368	
60	·71	·45	·37	73	·0518	
80	·53	·43	·38	73	·0664	
100	·43	·41	·39	72	·0809	
[145]				72	·1133	8·6895
150	·31	·41	·40	72	·1169	
186	8·91	·37	·44	69	·1423	
[200]				67	·1518	
[300]				55	·2128	
[395]				45	·2603	56·6572

N/W. 2. 60°27′N 2°06W, 110 m. 9.6.33, 1615-1720

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	11·50	35·34	26·96	111		
10	10·90	·32	27·06	102	·0106	
20	9·89	·34	·26	83	·0198	
30	·56	·34	·31	78	·0278	
40	·30	·33	·35	75	·0354	
60	8·66	·33	·45	66	·0495	
80	·60	·38	·50	61	·0622	
108	·59	·34	·47	65	·0798	
[145]				67	·1042	8·1170

Volume Transport

		Km³/hr
61°32′N 6°28′W.	ΔQ=·1207×185−11·5115=10·8180	+ 0·39
61°28′N 6°06′W.	ΔQ=·1145×185−11·7685= 9·4140	
”	ΔQ=·1275×210−14·7935=11·9815	− 0·05
61°17′N 5°24′W.	ΔQ=·1255×210−14·2000=12·1550	
”	ΔQ=·2118×400−46·5060=38·2140	− 0·79
61°07′N 4°45′W.	ΔQ=·2258×400−49·3005=41·0195	
”	ΔQ=·2512×465−64·8030=52·0050	− 1·39
61°02′N 4°22′W.	ΔQ=·2745×465−70·7190=56·9235	
”	ΔQ=·2569×420−58·7890=49·1090	− 2·06
60°57′N 4°03W.	ΔQ=·2773×420−60·0640=56·4020	
”	ΔQ=·2537×380 −49·4760=46·9300	+ 3·53
60°47′N 3°23′W.	ΔQ=·2096×380−45·1985=34·4495	
”	ΔQ=·2146×395−48·3430=36·4240	− 2·76
60°36′N 2°45′W.	ΔQ=·2603×395−56·6572=46·1613	
”	ΔQ=·1133×145− 8·6895= 7·7390	+ 0·21
60°27′N 2°06′W.	ΔQ=·1042×145− 8·1170= 6·9920	
		− 2·92

FAROE BANK—BUTT OF LEWIS
F.R.S. *EXPLORER*
20-22 June. 1933

NNE. 5. 60°54′N 8°16′W, 118 m. 20.6.33, 1050-1200

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	11·16	35·38	27·06	101		
10	·20	·39	·06	102	·0102	
20	10·89	·36	·09	99	·0202	
30	·48	·35	·16	93	·0298	
40	·02	·39	·27	82	·0386	
60	9·64	·38	·33	77	·0545	
80	·15	·35	·39	72	·0694	
[100]	·14	·35	·39	72	·0838	
115	·13	·35	·39	72		
[200]				72	·1558	
[300]				72	·2278	
[400]				72	·2998	
[500]				46	·3588	
[550]				35	·3790	113·4120

NNE. 5. 60°35′N 8°00′W, 768 m. 20.6.33, 1645-1945

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	11·57	35·51	27·08	99		
10	·56	·42	·01	106	·0102	
20	·26	·40	·06	102	·0206	
30	10·31	·39	·22	87	·0300	
40	·21	·40	·24	85	·0386	
60	9·83	·42	·33	77	·0548	
80	·67	·42	·36	75	·0700	
100	·08	·41	·45	66	·0841	
200	·04	·35	·41	72	·1531	
300	8·91	·37	·44	71	·2246	
400	·77	·36	·45	72	·2961	
500	5·79	·32	·85	34	·3491	
[550]	−0·13	·21	28·28	−14	·3541	111·1440
600	−0·52	34·93	·09	3		

NE. 4. 60°12′N 7°40′W, 710 m. 20/21.6.33, 2240-0045

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	11·49	35·37	26·99	108		
10	·50	·38	·99	108	·0108	
20	·48	·37	·99	108	·0216	
30	·01	·38	27·09	99	·0320	
40	10·96	·38	·10	98	·0418	
60	·46	·37	·18	91	·0607	
80	9·56	·38	·34	77	·0775	
100	·36	·36	·36	75	·0927	
200	·02	·37	·42	71	·1657	
300	8·94	·32	·40	75	·2387	
400	·86	·33	·42	75	·3137	
500	·77	·35	·45	74	·3882	
[550]	·67	·33	·45	75	·4254	121·1570
700	·38	·32	·48	75		

NE. 4. 59°56′N 7°27′W, 840 m. 21.6.33, 0300-0600

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	12·30	35·40	26·86	120		
10	·30	·41	·86	121	·0120	
20	·30	·40	·86	121	·0241	
30	·28	·39	·85	122	·0363	
40	11·33	·38	27·03	105	·0477	
60	10·66	·40	·16	93	·0675	
80	·02	·39	·27	83	·0851	
100	9·72	·43	·35	76	·1010	
200	·10	·39	·43	70	·1740	
[300]	·01	·38	·43	72	·2450	
400	8·90	·37	·44	73	·3175	
[500]	·80	·37	·45	74	·3910	
[550]	·75	·37	·47	73	·4278	124·2215
800	·31	·30	·48	77		

NE. 4. 59°44′N 7°15′W 850 m. 21.6.33 0720-0915

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	11·89	35·39	26·93	114		
10	·89	·44	·97	110	·0112	
20	·82	·44	·98	109	·0222	
30	·78	·62	27·13	95	·0324	
40	·67	·39	26·97	111	·0427	
60	10·76	·42	27·16	93	·0631	
80	·01	·43	·30	80	·0804	
100	9·94	·45	·33	78	·0962	
200	·14	·43	·45	68	·1692	
[300]	·13	·45	·46	70	·2382	
400	·12	·46	·48	70	·3082	
[500]	·08	·40	·44	76	·3812	
[550]	·03	·35	·40	80	·4202	120·5955
600	8·99	·33	·40	81		
840	·80	·73	·74			

S. 2. 59°31′N 7°05′W 1140 m. 21.6.33 1120-1450

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	12·61	35·44	26·83	123		
10	·52	·57	·94	113	·0118	
20	·50	·40	·82	125	·0237	
30	·18	·40	·88	119	·0359	
40	11·03	·51	27·18	91	·0464	
60	10·16	·43	·28	82	·0637	
80	9·88	·42	·32	78	·0797	
100	·80	·42	·33	78	·0953	
200	·48	·41	·38	75	·1718	
300	·17	·39	·42	73	·2458	
[400]	·00	·37	·43	74	·3193	
500	8·96	·36	·43	76	·3943	103·4010
[550]	·95	·38	·44	77	·4325	124·0710
700	·92	·61	·63	62		
1100	7·43	·23	·56	73		

E. 2. 59°17′N 6°53′W 271 m. 21.6.33 1610-1745

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	12·76	35·55	26·88	118		
10	·65	·37	·76	130	·0124	
20	·19	·94	27·30	79	·0228	
30	11·80	·41	26·96	112	·0324	
40	10·91	·46	27·17	92	·0426	
60	·21	·48	·31	79	·0596	
80	·20	·52	·34	77	·0752	
100	·12	·47	·32	79	·0908	
[195]				78	·1654	17·0885
200	9·84	·46	·35	78	·1693	
265	·67	·60	·58	58		
[300]				60	·2383	
[400]				70	·3033	
[500]				75	·3758	99·3390

SE. 2. 59°00′N 6°40′W 119 m. 21.6.33 2010-2110

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	13·14	35·35	26·65	140		
10	12·78	·36	·73	133	·0136	
20	·34	·35	·81	126	·0266	
30	11·77	·38	·95	112	·0385	
40	·47	·36	·99	109	·0495	
60	9·94	·46	27·34	76	·0680	
80	·64	·43	·37	74	·0830	
[100]				75	·0979	
115	·55	·41	·36	75		
[120]				75	·1129	7·6365
[195]				74	·1687	18·1920

E. 2. 58°40′N 6°10′W 115 m. 22.6.33 0200-0310

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	12·86	35·16	26·56	149		
10	·53	·14	·61	144	·0146	
20	11·85	·12	·73	133	·0284	
30	10·73	·14	·95	112	·0406	
40	·34	·15	27·03	105	·0514	
60	·00	·40	·28	82	·0701	
80	9·17	·30	·35	75	·0858	
[100]				65	·0998	
113	·30	·58	·54	58		
[120]				57	·1120	7·8410

VOLUME TRANSPORT

Km³/hr.

60°54′N 8°16′W. $\Delta Q = ·3790 \times 550 - 113·4120 = 95·0380$

+3·23

60°35′N 8°00′W. $\Delta Q = ·3541 \times 550 - 111·1440 = 83·6110$

−8·29

60°12′N 7°40′W. $\Delta Q = ·4254 \times 550 - 121·1570 = 112·8130$

+0·50

59°56′N 7°27′W. $\Delta Q = ·4278 \times 550 - 124·2215 = 111·0685$

+0·16

59°44′N 7°15′W. $\Delta Q = ·4202 \times 550 - 120·5955 = 110·5145$

−0·94

59°31′N 7°05′W. $\Delta Q = ·4325 \times 550 - 124·0710 = 113·8040$

,, $\Delta Q = ·3943 \times 500 - 103·4010 = 93·7490$

+1·49

59°17′N 6°53′W. $\Delta Q = ·3758 \times 500 - 99·3390 = 88·5610$

,, $\Delta Q = ·1654 \times 195 - 17·0885 = 15·1645$

+0·13

59°00′N 6°40′W. $\Delta Q = ·1687 \times 195 - 18·1920 = 14·7045$

,, $\Delta Q = ·1129 \times 120 - 7·6365 = 5·9115$

+0·09

58°40′N 6°10′W. $\Delta Q = ·1120 \times 120 - 7·8410 = 5·5990$

−3·63

1934

NOLSØ, FAROE—FLUGGA, SHETLAND

Danish Research Vessel *DANA*

21-22 April, 1934

62°00′N 6°12′W 85 m. 22.4.34 1630-1649

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	6·27	35·19	27·69	42		
10	·29	·23	·72	39	·0040	
25	·31	·21	·70	41	·0100	
50	·31	·19	·69	42	·0204	
75	·31	·21	·70	42	·0309	
[100]				42	·0414	
[150]				45	·0632	4·6650

61°54′N 5°45′W 217 m. 22.4.34 1400-1419

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	6·81	35·17	27·60	50		
10	·67	·19	·64	47	·0048	
25	·67	·19	·64	47	·0118	
50	·65	·19	·64	47	·0236	
75	·65	·19	·64	47	·0354	
100	·67	·17	·62	50	·0475	
[150]				50	·0725	5·3647
200	·68	·19	·64	50		

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
			61°49′N 5°21′W			22.4.34
			185 m.			1112-1132
0	6·77	35·23	27·66	45		
10	·66	·21	·66	45	·0045	
25	·64	·21	·66	45	·0113	
50	·64	·21	·66	45	·0225	
75	·64	·21	·66	46	·0339	
100	·62	·19	·65	47	·0455	
175	·62	·19	·65	48	·0811	
[200]				49	·0932	9·1873
			61°41½′N 4°44′W			22.4.34
			215 m.			0734-0754
0	7·19	35·23	27·61	49		
10	·17	·21	·60	50	·0050	
25	·10	·23	·62	49	·0124	
50	6·99	·21	·62	49	·0246	
75	·81	·21	·64	48	·0367	
100	·70	·21	·66	46	·0485	
200	·44	·19	·67	47	·0950	9·6242
[300]				50	·1435	
[330]				49	·1583	26·0762
			61°35′N 4°15′W			22.4.34
			725 m.			0444-0525
0	7·59	35·23	27·54	56		
10	·52	·23	·55	55	·0056	
25	·52	·23	·55	55	·0138	
50	·52	·21	·53	58	·0279	
75	·52	·21	·53	58	·0424	
100	·47	·21	·54	58	·0569	
200	·08	·19	·59	54	·1129	
300	6·62	·12	·59	56	·1679	
[330]				52	·1841	30·6247
400	4·58	34·96	·72	43	·2174	
[425]				37	·2274	50·1797
500	2·08	·95	·95	20		
			61°28′N 3°42′W			22.4.34
			1275 m.			0115-0228
0	8·27	35·34	27·52	58		
10	·23	·34	·52	58	·0058	
25	·23	·34	·52	58	·0145	
50	·20	·32	·51	60	·0293	
75	·10	·34	·54	57	·0439	
100	7·92	·30	·54	58	·0583	
200	·75	·29	·56	57	·1158	
300	·06	·21	·61	54	·1713	
400	6·22	·10	·63	53	·2248	45·7862
[425]				48	·2374	51·5637
500	3·42	34·96	·84	32		
			61°14′N 2°40′W			21.4.34
			1100 m.			1935-2101
0	8·09	35·32	27·52	58		
10	·01	·32	·54	56	·0057	
25	·00	·32	·54	56	·0141	
50	7·80	·30	·56	55	·0280	
75	·61	·26	·56	55	·0418	
100	·49	·26	·58	54	·0554	
200	·12	·08	·49	64	·1144	
300	5·58	·01	·64	50	·1714	
400	3·94	34·97	·80	35	·2139	44·8357
[490]				20	·2387	65·2027
500	1·96	·96	·97	18		

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
			61°08′N 2°10′W			21.4.34
			500 m.			1630-1704
0	8·60	35·37	27·49	61		
10	·57	·39	·51	59	·0060	
25	·57	·41	·52	58	·0148	
50	·51	·39	·52	59	·0294	
75	·50	·39	·52	59	·0442	
100	·49	·37	·51	61	·0592	
150	·55	·37	·50	63	·0902	
200	·42	·37	·52	62	·1214	
300	7·82	·30	·56	59	·1819	
[320]				59	·1937	30·8970
400	·91	·35	·59	58	·2404	
[490]				50	·2890	72·0790
			61°01′N 1°36′W			21.4.34
			140 m.			1346-1408
0	8·37	35·41	27·56	54		
10	·29	·37	·54	56	·0055	
25	·21	·39	·56	54	·0137	
50	·16	·39	·57	54	·0272	
75	·16	·41	·59	53	·0406	
100	·06	·41	·60	52	·0537	
[125]				48	·0662	4·2078
140	7·70	·41	·68	45		
[200]				49	·1042	
[300]				60	·1587	
[320]				59	·1706	27·0420
			60°53′N 1°06′W			21.4.34
			105 m.			1106-1127
0	8·09	35·41	27·61	49		
10	·07	·39	·60	50	·0050	
25	·03	·37	·58	53	·0127	
50	7·96	·37	·60	51	·0257	
75	·42	·44	·74	38	·0368	
100	·38	·41	·74	39	·0464	
[125]				43	·0566	3·7465

VOLUME TRANSPORT

		Km³/hr.
62°00′N 6°12′W.	$\Delta Q = \cdot0632 \times 150 - 4\cdot6650 = 4\cdot8150$	−0·19
61°54′N 5°45′W.	$\Delta Q = \cdot0725 \times 150 - 5\cdot3647 = 5\cdot5103$	
”	$\Delta Q = \cdot0975 \times 200 - 9\cdot6147 = 9\cdot8853$	+0·12
61°49′N 5°21′W.	$\Delta Q = \cdot0932 \times 200 - 9\cdot1873 = 9\cdot4527$	
61°41½′N 4°44′W.	$\Delta Q = \cdot0950 \times 200 - 9\cdot6242 = 9\cdot3758$	+0·02
”	$\Delta Q = \cdot1583 \times 330 - 26\cdot0762 = 26\cdot1628$	−1·11
61°35′N 4°15′W.	$\Delta Q = \cdot1841 \times 330 - 30\cdot6247 = 30\cdot1283$	
”	$\Delta Q = \cdot2274 \times 425 - 50\cdot1797 = 46\cdot4653$	−0·81
61°28′N 3°42′W.	$\Delta Q = \cdot2374 \times 425 - 51\cdot5637 = 49\cdot3313$	
”	$\Delta Q = \cdot2248 \times 400 - 45\cdot7862 = 44\cdot1338$	+0·96
61°14′N 2°40′W.	$\Delta Q = \cdot2139 \times 400 - 44\cdot8357 = 40\cdot7243$	
”	$\Delta Q = \cdot2387 \times 490 - 65\cdot2027 = 51\cdot7603$	−5·01
61°08′N 2°10′W.	$\Delta Q = \cdot2890 \times 490 - 72\cdot0790 = 69\cdot5310$	
”	$\Delta Q = \cdot1937 \times 320 - 30\cdot8970 = 31\cdot0870$	+1·00
61°01′N 1°36′W.	$\Delta Q = \cdot1706 \times 320 - 27\cdot0420 = 27\cdot5500$	
”	$\Delta Q = \cdot0662 \times 125 - 4\cdot2078 = 4\cdot0672$	+0·21
60°53′N 1°06′W.	$\Delta Q = \cdot0566 \times 125 - 3\cdot7465 = 3\cdot3285$	
		−4·81

NOLSØ, FAROE—FLUGGA, SHETLAND
Danish Research Vessel *DANA*
31 May - 1 June, 1934

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
			62°00′N 6°12′W 123 m.			31.5.34 0300-0309
0	7·38	35·19	27·54	56		
10	·38	·19	·54	56	·0056	
[25]	·39	·19	·54	56	·0140	
50	·41	·19	·54	57	·0281	
[75]	·40	·19	·54	57	·0423	
[100]	·38	·19	·54	58	·0567	
120	·36	·19	·54	58	·0683	
[200]				55	·1132	
[225]				54	·1268	14·3137
			61°54½′N 5°45′W 325 m.			31.5.34 0524-0543
0	7·82	35·26	27·53	57		
10	·79	·25	·53	57	·0057	
25	·76	·26	·54	56	·0142	
50	·25	·17	·55	56	·0282	
[75]	·05	·17	·58	53	·0418	
100	6·95	·17	·60	52	·0549	
200	·73	·19	·63	51	·1064	
[225]				51	·1192	13·6765
[250]				51	·1319	16·8140
300	·71	·21	·65	50		
			61°49′N 5°21′W 173 m.			31.5.34 0738-0749
0	8·08	35·21	27·46	63		
10	7·91	·23	·50	60	·0062	
25	·66	·19	·50	60	·0152	
50	·52	·21	·53	58	·0300	
[75]	·26	·20	·56	55	·0441	
100	·10	·19	·58	54	·0577	
165	·03	·19	·59	54		
[200]				54	·1117	
[250]				51	·1379	17·6652
[285]				50	·1559	22·7982
			61°42′N 4°46′W 400 m.			31.5.34 1020-1048
0	8·61	35·30	27·43	66		
10	·53	·30	·44	66	·0066	
25	·39	·28	·45	65	·0164	
50	·26	·28	·47	63	·0324	
75	·02	·30	·52	59	·0476	
100	7·91	·26	·52	60	·0625	
200	·17	·21	·59	55	·1200	
[285]				52	·1655	24·4505
300	6·18	·10	·64	51	·1730	
390	4·22	34·97	·76	39		
[400]				39	·2180	46·5167
			61°35′N 4°15′W 1075 m.			31.5.34 1302-1355
0	9·13	35·34	27·38	71		
10	·03	·34	·40	69	·0070	
25	8·81	·34	·43	67	·0172	
50	·51	·32	·46	64	·0336	
75	·41	·32	·48	63	·0495	
100	·32	·32	·49	63	·0653	
200	7·80	·30	·56	57	·1253	
300	6·84	·19	·62	53	·1803	
400	5·24	·03	·70	46	·2298	48·9403
[445]				35	·2480	59·6908
500	2·17	34·94	·94	21		
			61°28′N 3°42′W 1375 m.			31.5.34 1550-1644
0	9·49	35·32	27·31	78		
10	·01	·32	·39	70	·0074	
25	8·79	·32	·42	68	·0178	
50	·56	·32	·46	64	·0343	
75	·34	·32	·49	62	·0501	
100	·12	·30	·51	61	·0655	
200	7·72	·30	·58	56	·1240	
300	6·96	·19	·60	55	·1795	
400	5·14	·05	·73	43	·2285	
[445]				33	·2456	59·0944
500	2·31	34·96	·94	21	·2605	
[540]				16	·2679	83·4452
600	0·44	·93	28·05	8		
			61°19′N 3°02′W 1375 m.			31.5.34 1909-1959
0	9·45	35·34	27·33	76		
10	·34	·34	·35	74	·0075	
25	·05	·34	·40	70	·0183	
50	8·73	·34	·45	65	·0352	
75	·71	·34	·45	66	·0516	
100	·69	·34	·45	66	·0681	
200	·64	·34	·46	67	·1346	
300	·49	·34	·49	66	·2011	
400	·10	·32	·53	64	·2661	
500	7·14	·23	·60	58	·3271	
[540]				51	·3489	96·9410
[575]				45	·3657	109·4010
600	4·49	·01	·77	41		
			61°08′N 2°10′W 570 m.			1.6.34 0307-0346
0	9·33	35·34	27·35	74		
10	·12	·34	·38	71	·0072	
25	·08	·34	·39	71	·0178	
50	8·89	·39	·46	64	·0347	
75	·73	·34	·45	66	·0509	
100	·69	·34	·45	66	·0674	
200	·22	·32	·51	62	·1314	
300	7·70	·28	·57	58	·1914	
[335]				57	·2115	36·5593
400	6·74	·16	·60	56	·2484	
500	5·17	·04	·72	45	·2989	
[575]				27	·3259	102·2935
			61°00′N 1°35′W 145 m.			1.6.34 0611-0629
0	9·39	35·39	27·38	71		
10	·39	·39	·38	71	·0071	
25	·19	·34	·38	72	·0178	
50	8·84	·34	·43	67	·0352	
75	·77	·34	·44	67	·0520	
100	·72	·35	·45	66	·0686	
[125]				62	·0846	5·3973
140	·26	·37	·54	59		
[200]				58	·1306	
[300]				57	·1881	
[335]				56	·2079	36·3073
			60°53′N 1°06′W 101 m.			1.6.34 0833-0852
0	9·21	35·35	27·37	72		
10	·17	·32	·36	73	·0072	
25	8·91	·32	·40	70	·0179	
50	·42	·32	·48	62	·0344	
75	·22	·34	·53	58	·0494	
98	·20	·34	·53	59		
[125]				59	·0786	5·1255

VOLUME TRANSPORT

		Km³/hr
62°00′N 6°12′W.	ΔQ=·1268×225− 14·3137= 14·2163	+0·30
61°54½′N 5°45′W.	ΔQ=·1192×225− 13·6765= 13·1435	
”	ΔQ=·1319×250− 16·8140= 16·1610	−0·18
61°49′N 5°21′W.	ΔQ=·1379×250− 17·6652= 16·8098	
”	ΔQ=·1559×285− 22·7982= 21·6333	−0·30
61°42′N 4°46′W.	ΔQ=·1655×285− 24·4505= 22·7170	
”	ΔQ=·2180×400− 46·5167= 40·6833	−0·64
61°35′N 4°15′W.	ΔQ=·2298×400− 48·9403= 42·9797	
”	ΔQ=·2480×445− 59·6908= 50·6692	+0·13
61°28′N 3°42′W.	ΔQ=·2456×445− 59·0944= 50·1976	
”	ΔQ=·2679×540− 83·4452= 61·2208	−8·51
61°19′N 3°02′W.	ΔQ=·3489×540− 96·9410= 91·4650	
”	ΔQ=·3657×575−109·4010=100·8765	+4·44
61°08′N 2°10′W.	ΔQ=·3259×575−102·2935= 85·0990	
”	ΔQ=·2115×335− 36·5593= 34·2932	+0·27
61°00′N 1°35′W.	ΔQ=·2079×335− 36·3073= 33·3392	
”	ΔQ=·0846×125− 5·3973= 5·1777	+0·14
60°53′N 1°06′W.	ΔQ=·0786×125− 5·1255= 4·6995	
		−4·35

NOLSØ, FAROE—FLUGGA, SHETLAND

Danish Research Vessel *DANA*

11-13 July, 1934

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
			62°00′N 6°12′W			11.7.34
			122 m.			1837-1849
0	10·57	35·24	27·06	101		
10	·29	·21	·09	99	·0100	
25	9·53	·26	·25	84	·0237	
50	8·88	·26	·36	74	·0435	
75	·62	·26	·40	71	·0616	
100	·60	·26	·40	71	·0794	
115	·61	·26	·40	71	·0900	
[160]				65	·1202	10·5071
			61°49′N 5°18′W			11.7.34
			200 m.			1330-2351
0	11·96	35·24	26·80	126		
10	·19	·24	·95	112	·0119	
25	9·71	·23	27·20	89	·0270	
50	8·51	·29	·44	66	·0464	
75	·08	·29	·51	60	·0622	
100	·00	·29	·52	60	·0772	
150	7·74	·28	·55	58	·1067	
[160]				57	·1123	10·0538
180	·59	·28	·58	55		
[200]				53	·1337	
[300]				45	·1827	
[320]				41	·1913	34·4738
			61°40′N 4°40′W			12.7.34
			ca530 m.			0440-0509
0	10·99	35·26	27·00	107		
10	·94	·27	·02	105	·0106	
25	9·29	·26	·30	79	·0244	
50	8·26	·27	·46	64	·0423	
75	·25	·32	·50	61	·0579	
100	·20	·32	·51	61	·0731	
150	7·90	·27	·52	60	·1033	
200	·54	·25	·56	57	·1325	
[270]				51	·1703	24·9423
300	5·92	·09	·66	49	·1855	
[320]				45	·1949	34·0483
400	2·44	34·87	·86	28		
480	0·88	·93	28·07			

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
			61°32′N 4°02′W			12.7.34
			1340 m.			0846-0933
0	10·88	35·08	26·88	118		
10	·80	·08	·89	118	·0118	
25	·27	·08	·99	109	·0288	
50	7·99	·08	27·36	74	·0517	
75	6·88	·08	·52	59	·0683	
100	·08	·08	·63	49	·0818	
150	5·18	·00	·68	45	·1053	
200	3·81	34·94	·79	34	·1251	
[270]				26	·1461	24·6764
300	2·03	·88	·90	23	·1536	
[350]				16	·1634	37·0444
400	0·42	·93	28·05	8		
			61°21′N 3°10′W			12.7.34
			1325 m.			1434-1545
0	11·99	35·26	26·81	125		
10	·77	·26	·85	122	·0124	
25	10·07	·26	27·16	92	·0284	
50	8·94	·26	·35	75	·0493	
75	·34	·30	·47	64	·0667	
100	·19	·30	·50	62	·0825	
150	7·99	·29	·52	60	·1130	
200	·66	·27	·56	57	·1422	
300	·39	·26	·59	56	·1987	
[350]				50	·2252	43·5642
400	5·18	·05	·72	44	·2487	
[500]				27	·2842	
[510]				25	·2868	84·8367
600	0·93	34·95	28·04	10		
			61°06′N 2°03′W			12.7.34
			400 m.			2030-2055
0	12·50	35·34	26·77	129		
10	·50	·34	·77	129	·0129	
25	11·27	·33	27·00	108	·0807	
50	9·71	·36	·30	80	·0542	
*[75]	8·87	·34	·42	69	·0728	
[100]	·61	·34	·46	65	·0896	
[150]	·20	·34	·53	60	·1208	
[200]	7·93	·34	·57	57	·1500	
[270]				60	·1910	29·0352
[300]	·65	·29	·54	61	·2090	
[375]	·26	·34	·68	49		
[400]				45	·2620	
[500]				27	·2980	
[510]				25	·3006	89·5932

*Temperature observations only extrapolated between 75 m. and 375 m.

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
			61°01′N 1°36′W			13.7.34
			138 m.			0319-0332
0	12·8	35·39	26·75	131		
10	·8	·39	·75	131	·0131	
25	11·6	·39	·98	110	·0312	
50	10·8	·41	27·15	94	·0567	
75	9·3	·42	·41	70	·0772	
100	·0	·40	·45	66	·0942	
[120]				67	·1075	7·3298
125	8·7	·34	·45	67		
[200]				57	·1557	
[270]				60	·1967	30·1418

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
			60°53′N 1°06′W			13.7.34
			106 m.			0625-0640
0	12·9	35·34	26·69	136		
10	·8	·34	·71	135	·0136	
25	10·6	·33	27·12	96	·0309	
50	9·4	·33	·33	77	·0525	
75	·0	·34	·40	71	·0710	
90	8·8	·34	·43	68	·0814	
[120]				67	·1016	6·8761

VOLUME TRANSPORT

		Km³/hr.
62°00′N 6°12′W.	ΔQ=·1202×160−10·5071= 8·7249	+0·23
61°49′N 5°18′W.	ΔQ=·1123×160−10·0538= 7·9142	
,,	ΔQ=·1913×320−34·4738=26·7422	−0·44
61°40′N 4°40′W.	ΔQ=·1949×320−34·0483=28·3197	
,,	ΔQ=·1703×270−24·9423=21·0387	+2·04
61°32′N 4°02′W.	ΔQ=·1461×270−24·6764=14·7706	
,,	ΔQ=·1634×350−37·0444=20·1456	−4·25
61°21′N 3°10′W.	ΔQ=·2252×350−43·5642=35·2558	
,,	ΔQ=·2868×510−84·8367=61·4313	−0·64
61°06′N 2°03′W.	ΔQ=·3006×510−89·5932=63·7128	
,,	ΔQ=·1910×270−29·0352=22·5348	−0·12
61°01′N 1°36′W.	ΔQ=·1967×270−30·1418=22·9672	
,,	ΔQ=·1075×120− 7·3298= 5·5702	+0·07
60°53′N 1°06′W.	ΔA=·1016×120− 6·8761= 5·3159	
		−3·11

1935

FAROE BANK—BUTT OF LEWIS

F.R.S. *EXPLORER*

27 May, 5-6 June, 1935

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
NE. 5.			60°54′N 8°16′W			6.6.35
			133 m.			2015-2105
0	8·90	35·36	27·43	66		
10	·90	·35	·43	66	·0066	
20	·87	·36	·44	66	·0132	
30	·89	·35	·43	67	·0198	
40	·76	·36	·46	64	·0264	
60	·75	·36	·46	65	·0393	
80	·76	·36	·46	65	·0523	
100	·76	·35	·45	66	·0654	
128	·76	·36	·46	66	·0839	
[200]				67	·1319	
[300]				65	·1979	
[400]				60	·2604	
[500]				58	·3194	
[550]				59	·3486	98·2480
ENE. 2.			60°35′N 8°00′W			6.6.35
			202 m.			1315-1505
0	9·62	35·39	27·34	75		
10	·58	·41	·36	73	·0074	
20	·58	·41	·36	73	·0147	
30	·55	·39	·35	74	·0221	
40	·48	·41	·38	72	·0294	
60	·29	·41	·41	69	·0435	
80	·13	·41	·44	67	·0571	
100	·01	·37	·42	69	·0707	
197	8·77	·37	·46	67	·1367	
[200]				67	·1387	
[300]				65	·2047	
[400]				60	·2672	
[500]				58	·3264	
[550]				59	·3554	101·5434

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
NE. 4.			60°12′N 7°40W			6.6.35
			530 m.			0750-0930
0	9·70	35·41	27·34	75		
10	·73	·43	·35	74	·0074	
20	·72	·42	·34	75	·0148	
30	·50	·42	·38	72	·0222	
40	·45	·41	·38	72	·0294	
60	·40	·41	·39	71	·0437	
80	·31	·39	·39	72	·0580	
100	·11	·37	·41	71	·0723	
200	8·81	·36	·45	68	·1418	
300	·64	·36	·47	68	·2098	
[400]	·28	·37	·54	63	·2753	
500	7·87	·38	·61	58	·3358	
[550]				59	·3650	104·2570
NE/E. 3.			59°56′N 7°27′W			6.6.35
			900 m.			0250-0520
0	9·91	35·47	27·35	74		
10	·95	·47	·34	75	·0074	
20	·92	·46	·34	75	·0149	
30	·96	·45	·33	76	·0225	
40	·97	·44	·32	78	·0302	
60	·97	·44	·32	78	·0458	
80	·95	·44	·32	79	·0615	
100	·81	·43	·34	77	·0771	
200	·16	·43	·45	68	·1496	
[300]	8·91	·42	·48	68	·2176	
400	·81	·41	·49	69	·2861	
[500]	·73	·39	·48	72	·3566	
[550]				73	·3928	109·5680
600	·65	·36	·47			
850	·06	·32	·53			
ENE. 2.			59°31′N 7°05′W			5.6.35
			1040 m.			1900-2350
0	10·64	35·50	27·25	83		
10	·66	·50	·24	84	·0084	
20	·64	·50	·25	84	·0168	
30	·56	·50	·26	83	·0252	
40	·52	·50	·27	82	·0334	
60	·50	·50	·27	83	·0499	
80	·13	·44	·29	81	·0663	
100	9·52	·44	·40	71	·0815	
200	·14	·44	·46	68	·1510	
[300]	·00	·42	·46	70	·2200	
400	8·93	·39	·45	72	·2910	
[500]	·88	·40	·47	73	·3635	
[550]				73	·4000	111·6815
600	·84	·41	·48	74		
800	·78	·39	·48			
1000	·32	·33	·50			
ENE. 4.			59°17′N 6°53′W			5.6.35
			493 m.			1530-1700
0	10·18	35·43	27·27	81		
10	·17	·43	·27	82	·0082	
20	·17	·42	·27	82	·0164	
30	·17	·45	·29	80	·0245	
40	·17	·44	·28	81	·0325	
60	·00	·44	·31	79	·0485	
80	9·90	·48	·36	75	·0639	
100	·77	·47	·38	73	·0787	
200	·61	·44	·38	75	·1527	
300	·47	·44	·40	76	·2282	
[320]				76	·2434	39·3445
[400]	·32	·43	·42	76	·3042	
480	·20	·42	·43	76		
[500]				76	·3802	
[550]				75	·4180	115·4235

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
E. 3.			59°00′N 6°40′W			5.6.35
			146 m.			1240-1305
0	9·75	35·20	27·17	91		
10	·75	·21	·17	91	·0091	
20	·77	·25	·20	88	·0181	
30	·75	·25	·20	89	·0269	
40	·62	·25	·23	86	·0357	
60	8·99	·32	·39	71	·0514	
80	·97	·42	·47	64	·0649	
100	·98	·41	·46	66	·0779	
[130]				67	·0979	6·8185
140	·98	·40	·45	67		
[200]				70	·1459	
[300]				76	·2189	
[320]				76	·2341	38·1415
ESE. 6.			58°40′N 6°10′W			27.5.35
			116 m.			0140-0325
0	9·40	35·02	27·08	99		
10	·41	·02	·08	100	·0100	
20	·29	·34	·35	74	·0187	
30	·11	·32	·37	73	·0261	
40	8·92	·31	·39	71	·0333	
60	·72	·30	·41	69	·0473	
80	·92	·37	·44	67	·0609	
110	·92	·38	·45	67	·0810	
[130]				67	·0944	6·4850

VOLUME TRANSPORT

		Km³/hr
60°54′N 8°16′W.	$\Delta Q=\cdot3486\times550-98\cdot2480=93\cdot4820$	
		−0·13
60°35′N 8°00′W.	$\Delta Q=\cdot3554\times550-101\cdot5434=93\cdot9266$	
		−0·73
60°12′N 7°40′W.	$\Delta Q=\cdot3650\times550-104\cdot2570=96\cdot4930$	
		−2·84
59°56′N 7°27′W.	$\Delta Q=\cdot3928\times550-109\cdot5680=106\cdot4720$	
		−0·53
59°31′N 7°05′W.	$\Delta Q=\cdot4000\times550-111\cdot6815=108\cdot3185$	
		−1·77
59°17′N 6°53′W.	$\Delta Q=\cdot4180\times550-115\cdot4235=114\cdot4765$	
,,	$\Delta Q=\cdot2434\times320-39\cdot3445=38\cdot5435$	+0·51
59°00′N 6°40′W.	$\Delta Q=\cdot2341\times320-38\cdot1415=36\cdot7705$	
,,	$\Delta Q=\cdot0979\times130-6\cdot8185=5\cdot9085$	+0·04
58°40′N 6°10′W.	$\Delta Q=\cdot0944\times130-6\cdot4850=5\cdot7870$	
		−5·45

NOLSØ, FAROE—FLUGGA, SHETLAND

F.R.S. *EXPLORER*

15, 17-19 June, 1935

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
E/N. 3.			62°00′N 6°12′W			15.6.35
			112 m.			0330-0505
0	8·54	35·25	27·40	69		
10	·53	·26	·41	68	·0068	
20	·21	·26	·46	64	·0134	
30	7·99	·26	·50	60	·0196	
40	·93	·25	·50	60	·0256	
60	·90	·25	·50	61	·0377	
80	·91	·26	·51	60	·0498	
105	·91	·29	·53	59	·0647	
[185]				53	·1095	10·4332
NE/N. 5.			61°54′N 5°45′W			17/18.6.35
			260 m.			2330-0045
0	8·70	35·32	27·43	66		
10	·70	·32	·43	66	·0066	
20	·70	·31	·42	68	·0133	
30	·71	·30	·42	68	·0201	
40	·71	·29	·41	69	·0269	
60	·41	·30	·46	65	·0403	
80	·06	·30	·52	59	·0527	
100	7·73	·30	·57	55	·0641	
[185]				52	·1096	10·6867
[200]	·36	·29	·62	52	·1176	
[230]				53	·1334	16·1545
250	·29	·28	·61	53		
NE/N. 3.			61°49′N 5°21′W			18.6.35
			197 m.			0220-0335
0	8·78	35·32	27·42	67		
10	·78	·31	·41	68	·0068	
20	·78	·33	·43	67	·0136	
30	·77	·33	·43	67	·0203	
40	·30	·31	·49	61	·0267	
60	7·96	·31	·54	57	·0385	
80	·90	·31	·55	56	·0498	
100	·74	·30	·56	56	·0610	
190	·64	·30	·58	55	·1110	
[200]				55	·1165	
[225]				54	·1301	15·1410
[230]				54	·1329	15·7995
NNE. 4.			61°42′N 4°51′W			18.6.35
			250 m.			0525-0655
0	8·89	35·30	27·39	70		
10	·90	·33	·41	68	·0069	
20	·90	·31	·39	70	·0138	
30	·90	·33	·41	69	·0208	
40	·61	·32	·45	65	·0275	
60	·39	·32	·48	63	·0403	
80	·20	·40	·58	54	·0520	
100	·05	·30	·52	60	·0634	
[200]	7·67	·29	·57	57	·1219	
[225]				56	·1360	15·7963
240	·62	·29	·58	56		
[300]				53	·1769	
[365]				44	·2084	40·0347
N. 2.			61°35′N 4°15′W			18.6.35
			1005 m.			0900-1115
0	9·27	35·37	27·38	71		
10	·27	·37	·38	71	·0071	
20	·26	·38	·39	70	·0141	
30	·24	·39	·40	70	·0211	
40	·23	·39	·40	70	·0281	
60	8·72	·38	·48	63	·0414	
80	·40	·37	·52	59	·0536	
100	·11	·36	·56	56	·0651	
200	7·48	·30	·60	54	·1201	
300	6·48	·23	·69	46	·1701	
[365]				37	·1971	39·0995
400	3·65	·00	·84	31	·2086	46·1005
600	−0·17	34·95	28·09	3		
N. 3.			61°28′N 3°42′W			18.6.35
			1240 m.			1305-1610
0	9·35	35·34	27·34	75		
10	·27	·35	·36	73	·0074	
20	·23	·36	·38	71	·0146	
30	·23	·35	·37	73	·0218	
40	·22	·36	·38	72	·0290	
60	·19	·36	·38	72	·0434	
80	8·46	·31	·46	65	·0571	
100	·16	·33	·53	59	·0695	
200	7·50	·30	·60	54	·1260	
300	6·45	·21	·68	47	·1765	
400	3·46	·00	·86	29	·2145	48·0280
600	0·26	34·95	28·07	5		

N. 4. 61°21′N 3°10′W 1424 m. 18.6.35 1815-2120

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·62	35·38	27·33	76		
10	·46	·37	·35	74	·0075	
20	·41	·37	·36	73	·0149	
30	·40	·37	·36	74	·0223	
40	·40	·38	·37	73	·0297	
60	8·81	·38	·46	65	·0435	
80	·64	·38	·49	62	·0562	
100	·35	·35	·51	61	·0685	
200	7·24	·29	·63	51	·1245	
300	5·95	·19	·73	42	·1710	
400	3·19	·00	·89	26	·2050	46·7965
[430]				23	·2124	53·0575
600	0·20	34·97	28·09	4		

NE. 3 61°14′N 2°40′W 1230 m. 18/19.6.35 2315-0235

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·85	35·41	27·31	78		
10	·82	·41	·32	77	·0078	
20	·85	·41	·31	78	·0156	
30	·85	·41	·31	78	·0234	
40	·86	·42	·32	78	·0312	
60	·85	·42	·32	78	·0468	
80	·72	·41	·34	77	·0623	
100	8·71	·37	·47	64	·0764	
200	·52	·37	·50	63	·1399	
300	7·24	·29	·63	52	·1974	
400	4·43	·06	·81	35	·2409	
[430]					·2507	60·8460
[470]					·2619	71·0700
600	0·02	34·96	28·09	4		

NE. 2. 61°08′N 2°10′W 460 m. 19.6.35 0415-0550

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·13	35·43	27·28	80		
10	·13	·44	·29	80	·0080	
20	·13	·44	·29	80	·0160	
30	·10	·44	·29	80	·0240	
40	·08	·44	·30	79	·0320	
60	·01	·44	·31	79	·0478	
80	9·41	·44	·41	70	·0627	
100	·20	·43	·44	67	·0764	
200	8·92	·38	·45	68	·1439	
300	·80	·36	·45	70	·2129	
[305]				70	·2164	33·8622
400	·43	·36	·51	66	·2809	
[470]				40	·3180	78·4405

NE. 2. 61°01′N 1°36′W 146 m. 19.6.35 0750-0900

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·78	35·38	27·30	79		
10	·78	·39	·31	78	·0078	
20	·71	·40	·33	76	·0155	
30	·69	·41	·34	75	·0231	
40	·68	·39	·33	77	·0307	
60	·11	·42	·45	66	·0450	
80	8·94	·42	·48	63	·0579	
100	·79	·42	·50	62	·0704	
[130]				58	·0884	6·0655
143	·20	·41	·58	55		
[200]				60	·1314	
[300]				70	·1964	
[305]				70	·1999	31·7873

NE. 1. 60°53′N 1°06′W 108 m. 19.6.35 1050-1155

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·60	35·39	27·34	75		
10	·38	·38	·37	72	·0074	
20	·25	·36	·38	71	·0146	
30	·11	·37	·41	69	·0216	
40	8·82	·39	·47	63	·0282	
60	·45	·39	·53	58	·0403	
80	·41	·39	·54	57	·0518	
105	·39	·39	·54	58	·0662	
[130]				55	·0803	5·4905

VOLUME TRANSPORT

		Km³/hr.
62°00′N 6°12′W.	$\Delta Q=\cdot1095\times185-10\cdot4332=9\cdot8243$	+0·07
61°54′N 5°45′W.	$\Delta Q=\cdot1096\times185-10\cdot6867=9\cdot5693$	
”	$\Delta Q=\cdot1334\times230-16\cdot1545=14\cdot5275$	−0·07
61°49′N 5°21′W.	$\Delta Q=\cdot1329\times230-15\cdot7995=14\cdot7675$	
”	$\Delta Q=\cdot1301\times225-15\cdot1410=14\cdot1315$	−0·19
61°42′N 4°51′W.	$\Delta Q=\cdot1360\times225-15\cdot7963=14\cdot8037$	
”	$\Delta Q=\cdot2084\times365-40\cdot0347=36\cdot0313$	+0·90
61°35′N 4°15′W.	$\Delta Q=\cdot1971\times365-39\cdot0995=32\cdot8420$	
”	$\Delta Q=\cdot2086\times400-46\cdot1005=37\cdot3395$	−0·12
61°28′N 3°42′W.	$\Delta Q=\cdot2145\times400-48\cdot0280=37\cdot7720$	
61°21′N 3°10′W.	$\Delta Q=\cdot2050\times400-46\cdot7965=35\cdot2035$	+0·72
”	$\Delta Q=\cdot2124\times430-53\cdot0575=38\cdot2745$	−2·44
61°14′N 2°40′W.	$\Delta Q=\cdot2507\times430-60\cdot8460=46\cdot9550$	
”	$\Delta Q=\cdot2619\times470-71\cdot0700=52\cdot0230$	−5·36
61°08′N 2°10′W.	$\Delta Q=\cdot3180\times470-78\cdot4405=71\cdot0195$	
”	$\Delta Q=\cdot2164\times305-33\cdot8622=32\cdot1398$	+0·66
61°01′N 1°36′W.	$\Delta Q=\cdot1999\times305-31\cdot1573=29\cdot8122$	
”	$\Delta Q=\cdot0884\times130-6\cdot0685=5\cdot4235$	+0·13
60°53′N 1°06′W.	$\Delta Q=\cdot0803\times130-5\cdot4892=4\cdot9498$	
		−5·70

1936

FAROE BANK—BUTT OF LEWIS

F.R.S. *EXPLORER*

28 May, 2-4 June, 1936

Var. 1. 60°54′N 8°16′W 175 m. 4.6.36 0035-0155

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·51	35·37	27·34	75		
10	·44	·37	·35	74	·0074	
20	·23	·39	·40	70	·0146	
30	·11	·35	·39	71	·0216	
40	·04	·33	·38	72	·0288	
60	8·93	·34	·41	69	·0429	
80	·70	·33	·44	67	·0565	
100	·70	·33	·44	67	·0699	
170	·70	·34	·45	68	·1171	
[200]				67	·1369	
[300]				66	·2034	
[400]				65	·2689	
[500]				64	·3334	
[550]				63	·3652	102·1050

Calm 60°35′N 8°00′W 3.6.36
370 m. plus* 1700-1820

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·13	35·41	27·27	81		
10	9·54	·40	·36	73	·0077	
20	·49	·50	·45	65	·0146	
30	·41	·45	·42	68	·0212	
40	·39	·38	·37	73	·0282	
60	·31	·40	·40	70	·0425	
80	·11	·38	·41	70	·0565	
100	·02	·44	·48	64	·0699	
200	8·77	·44	·52	62	·1329	
[300]	·64	·42	·52	64	·1959	
360	·58	·39	·51	66		
[400]				66	·2609	
[500]				64	·3259	
[550]				63	·3577	99·3870

*Only 400 metres of hydrographic warp available.

NE. 1-2. 60°12′N 7°40′W 3.6.36
825 m. 1045-1345

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·99	35·44	27·31	78		
10	·92	·42	·33	76	·0077	
20	·71	·41	·34	75	·0153	
30	·69	·40	·33	76	·0229	
40	·65	·40	·34	76	·0305	
60	·54	·40	·36	74	·0455	
80	·37	·40	·39	72	·0601	
100	·40	·40	·38	73	·0746	
200	·00	·40	·45	68	·1451	
[300]	8·85	·40	·47	68	·2131	
400	·79	·41	·49	69	·2816	
[500]	·38	·39	·54	65	·3486	
[550]	7·82	·33	·57	63	·3806	107·1435

NNE. 3. 59°56′N 7°27′W 3.6.36
585 m. 0555-0820

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·03	35·44	27·31	78		
10	·03	·45	·31	78	·0078	
20	·03	·44	·31	78	·0156	
30	·03	·44	·31	78	·0234	
40	·03	·44	·31	79	·0312	
60	·03	·44	·31	79	·0470	
80	9·87	·44	·34	77	·0626	
100	·46	·39	·36	75	·0778	
200	8·96	·37	·43	70	·1503	
300	·82	·37	·46	69	·2198	
[400]	·74	·36	·46	71	·2898	
500	·61	·35	·47	72	·3613	
[550]				73	·3975	110·8210

NNE. 2. 59°44′N 7°15′W 3.6.36
1150 m. 0120-0345

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·03	35·44	27·31	78		
10	·04	·44	·31	78	·0078	
20	9·97	·43	·31	78	·0156	
30	·95	·44	·32	77	·0234	
40	·95	·44	·32	78	·0312	
60	·82	·44	·35	75	·0465	
80	·70	·43	·36	75	·0615	
100	·47	·43	·40	71	·0761	
200	·14	·39	·42	71	·1471	
300	8·98	·39	·44	71	·2181	
400	·36	·39	·54	64	·2856	
[500]	·60	·38	·50	69	·3521	
[550]	·72	·37	·47	73	·3876	108·8395

NE. 2. 59°31′N 7°05′W 2.6.36
1070 m. 2115-2315

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·29	35·44	27·26	82		
10	·29	·44	·26	83	·0082	
20	·19	·44	·28	81	·0164	
30	·04	·43	·30	79	·0244	
40	9·96	·43	·31	79	·0323	
60	·70	·43	·36	74	·0476	
80	·60	·44	·38	73	·0623	
100	·54	·44	·39	72	·0768	
200	·21	·40	·41	72	·1488	
[300]	·04	·39	·44	71	·2203	
400	8·94	·38	·44	74	·2928	
[500]	·92	·38	·45	74	·3668	
[550]	·91	·38	·45	75	·4040	111·5805

NE. 2. 59°17′N 6°53′W 2.6.36
490 m. 1730-1900

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·40	35·36	27·18	90		
10	·48	·35	·16	92	·0091	
20	·25	·43	·26	83	·0179	
30	·19	·43	·27	82	·0261	
40	·13	·43	·28	81	·0343	
60	9·84	·44	·34	76	·0500	
80	·70	·44	·37	74	·0650	
100	·59	·44	·38	73	·0797	
200	·29	·40	·40	73	·1527	
300	·15	·40	·42	73	·2257	
[320]				73	·2403	39·3425
[400]	·06	·38	·43	74	·2992	
475	8·93	·36	·43	76		
[500]				76	·3742	
[550]				76	·4122	114·2575

NNE. 2. 59°00′N 6°40′W 2.6.36
149 m. 1345-1500

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·98	35·16	27·10	98		
10	·96	·14	·08	100	·0099	
20	·89	·15	·10	98	·0198	
30	·96	·22	·15	94	·0294	
40	10·12	·34	·21	88	·0385	
60	9·72	·43	·35	75	·0548	
80	·41	·41	·39	72	·0695	
100	·16	·37	·40	71	·0838	
[130]				72	·1052	7·3265
140	·14	·37	·40	72		
[200]				73	·1558	
[300]				73	·2288	
[320]				73	·2434	40·4235

W. 5. 58°40′N 6°10′W 28.5.36
113 m. 0710-0825

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·18	34·73	26·89	117		
10	·18	·74	·90	117	·0117	
20	·00	·82	·99	108	·0229	
30	·20	35·03	27·12	96	·0331	
40	·38	·27	·28	81	·0419	
60	8·74	·28	·40	70	·0570	
80	·74	·28	·40	71	·0711	
100	·74	·27	·39	72	·0854	
110	·73	·27	·39	72		
[130]				72	·1070	7·6075

VOLUME TRANSPORT

		Km³/hr
60°54′N 8°16′W.	ΔQ=·3652×550−102·1050= 98·7550	
		+0·40
60°35′N 8°00′W.	ΔQ=·3577×550− 99·3870= 97·3480	
		−1·37
60°12′N 7°40′W.	ΔQ=·3806×550−107·1435=102·1865	
		−1·60
59°56′N 7°27′W.	ΔQ=·3975×550−110·8210=107·8040	
		+0·98
59°44′N 7°15′W.	ΔQ=·3876×550—108·8395=104·3405	
		−1·80
59°31′N 7°05′W.	ΔQ=·4040×550−111·5805=110·6195	
		−0·53
59°17′N 6°53′W.	ΔQ=·4122×550−114·2575=112·4525	
”	ΔQ=·2403×320− 39·3425= 37·5535	
		+0·03
59°00′N 6°40′W.	ΔQ=·2434×320− 40·4235= 37·4645	
”	ΔQ=·1052×130− 7·3265= 6·3495	
		+0·01
58°40′N 6°10′W.	ΔQ=·1070×130− 7·6075= 6·3025	
		−3·88

NOLSØ, FAROE—FLUGGA, SHETLAND

F.R.S. *EXPLORER*

5, 13-15 June, 1936

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SW. 2.			62°00′N 6°12′W			5.6.36
			115 m.			0200-0300
0	8·32	35·30	27·48	62		
10	·32	·28	·46	64	·0063	
20	·29	·30	·48	62	·0126	
30	·20	·29	·49	61	·0188	
40	·20	·30	·50	60	·0248	
60	·20	·29	·49	62	·0370	
80	·20	·29	·49	62	·0494	
[100]	·20	·29	·49	62	·0618	
110	·21	·29	·49	63		
[200]				52	·1188	12·1250
SSW. 2.			61°54′N 5°45′W			13.6.36
			290 m.			1025-1135
0	9·33	35·32	27·33	76		
10	·19	·33	·36	73	·0074	
20	8·92	·32	·40	70	·0146	
30	·91	·33	·41	69	·0216	
40	·86	·33	·42	68	·0284	
60	·19	·33	·52	59	·0401	
80	·04	·33	·54	57	·0517	
100	7·63	·31	·59	53	·0627	
[200]	·23	·30	·64	50	·1142	12·1700
[225]					·1267	15·1812
280	·16	·30	·65	50		
SSW. 2.			61°49′N 5°21′W			13.6.36
			158 m.			1315-1405
0	9·74	35·31	27·25	83		
10	·55	·32	·29	80	·0082	
20	·14	·31	·36	73	·0158	
30	·54	·30	·28	81	·0235	
40	·01	·31	·38	72	·0311	
60	8·59	·30	·43	67	·0450	
80	·28	·31	·49	62	·0579	
100	7·90	·30	·54	58	·0699	
150	·58	·30	·59	54		
[200]				51	·1244	13·4135
[225]				50	·1370	16·6810
SSE. 2.			61°42′N 4°51′W			13.6.36
			238 m.			1625-1740
0	10·01	35·31	27·21	87		
10	9·29	·31	·33	76	·0082	
20	·23	·30	·33	76	·0158	
30	·15	·31	·35	74	·0233	
40	·01	·30	·37	73	·0307	
60	8·79	·31	·41	69	·0449	
80	·36	·31	·48	63	·0581	
100	·23	·30	·49	62	·0706	
[200]	7·78	·29	·55	58	·1306	13·7595
230	·64	·29	·57	57		
[300]				52	·1856	
[395]				40	·2293	49·2773
SSW. 5.			61°35′N 4°15′W			13.6.36
			880 m.			1955-2200
0	9·61	35·31	27·28	80		
10	·13	·31	·35	74	·0077	
20	·14	·30	·35	74	·0151	
30	·01	·30	·37	73	·0225	
40	8·77	·38	·47	63	·0293	
60	·51	·32	·46	65	·0421	
80	·35	·32	·49	62	·0548	
100	·23	·30	·49	62	·0672	
200	7·73	·31	·58	56	·1262	
300	6·83	·26	·66	49	·1787	
[395]				36	·2191	47·3130
400	4·58	·09	·81	35	·2207	
[500]	1·23	34·95	28·02	12	·2442	71·6325
SW. 3.			61°28′N 3°42′W			14.6.36
			1245 m.			0025-0255
0	9·89	35·36	27·27	81		
10	·89	·36	·27	82	·0082	
20	·64	·35	·30	79	·0162	
30	·43	·35	·34	75	·0239	
40	·28	·36	·37	73	·0313	
60	8·96	·35	·41	69	·0455	
80	·64	·36	·47	64	·0588	
100	·17	·33	·52	60	·0712	
200	7·60	·30	·59	55	·1287	
300	·06	·26	·63	52	·1822	
400	5·37	·16	·77	39	·2277	
[490]				24	·2561	71·5565
[500]	2·94	·03	·94	22	·2582	74·0805
600	0·94	34·92	28·00	14		
SSE. 5.			61°21′N 3°10′W			14.6.36
			1480 m.			0535-0830
0	9·62	35·35	27·31	78		
10	·55	·36	·33	76	·0077	
20	·50	·36	·33	76	·0153	
30	·24	·35	·37	73	·0227	
40	·15	·35	·38	72	·0299	
60	8·60	·32	·45	66	·0437	
80	·19	·34	·53	58	·0561	
100	7·95	·32	·55	57	·0676	
200	·46	·29	·60	54	·1231	
300	6·41	·24	·71	44	·1721	
400	4·05	·07	·85	30	·2091	
[405]				27	·2105	47·9815
[490]				21	·2321	66·7865
[500]	2·19	34·96	·95	20		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SSE. 5.		61°14′N 2°40′W				14.6.36
		1085 m.				1050-1330
0	10·08	35·35	27·22	86		
10	·02	·35	·24	84	·0085	
20	9·52	·35	·32	77	·0165	
30	·18	·34	·37	74	·0241	
40	·12	·34	·38	73	·0315	
60	8·95	·35	·42	68	·0456	
80	7·81	·32	·57	55	·0579	
100	·59	·30	·59	53	·0687	
200	6·00	·21	·74	40	·1152	
300	4·15	·08	·85	30	·1502	
400	1·59	34·94	·97	17	·1737	
[405]				13	·1745	43·2510
[455]				9	·1806	52·1237
SE. 4.		61°08′N 2°10′W				14.6.36
		630 m.				1545-1655
0	10·29	35·37	27·20	88		
10	·12	·39	·25	84	·0086	
20	9·52	·39	·36	73	·0164	
30	·44	·38	·36	74	·0238	
40	·39	·38	·37	73	·0312	
60	·13	·38	·41	69	·0454	
80	8·91	·37	·44	67	·0590	
100	·31	·33	·50	62	·0719	
200	7·34	·31	·63	51	·1284	
300	6·67	·26	·69	46	·1769	
[375]					·2099	43·5480
400	5·57	·17	·76	41	·2204	
[455]					·2388	61·5360
[500]	2·12	·04	28·01	14		
600	–0·77	34·94	·11	1		
SE. 3.		61°01′N 1°36′W				14.6.36
		170 m.				1925-2040
0	10·44	35·41	27·21	87		
10	·42	·40	·21	87	·0087	
20	9·99	·41	·29	80	·0171	
30	·97	·41	·29	80	·0251	
40	·88	·42	·32	78	·0330	
60	·75	·40	·32	78	·0486	
80	·47	·42	·39	72	·0636	
100	·39	·39	·38	73	·0781	
[145]				71	·1105	8·2725
160	8·91	·35	·42	70		
[200]				63	·1461	
[300]				50	·2026	
[375]				46	·2386	49·2190
SSE. 3.		60°56′N 1°00′W				15.6.36
		120 m.				0020-
0	10·54	35·32	27·12	96		
10	·52	·31	·12	96	·0096	
20	9·63	·32	·28	81	·0184	
30	·47	·29	·29	80	·0264	
40	·51	·37	·34	76	·0342	
60	·03	·31	·37	73	·0491	
80	7·92	·28	·52	59	·0623	
[100]	·90	·25	·50	62	·0744	
115	·89	·23	·49	62		
[145]				66	·1032	8·0250

VOLUME TRANSPORT

		Km³/hr.
62°00′N 6°12′W.	ΔQ=·1188×200—12·1250=11·6350	+0·27
61°54′N 5°45′W.	ΔQ=·1142×200—12·1700=10·6700	
„	ΔQ=·1267×225—15·1812=13·3263	—0·23
61°49′N 5°21′W.	ΔQ=·1370×225—16·6810=14·1440	
„	ΔQ=·1244×200—13·4135=11·4665	—0·25
61°42′N 4°51′W.	ΔQ=·1306×200—13·7595=12·3605	
„	ΔQ=·2293×395—49·2773=41·2962	—1·10
61°35′N 4°15′W.	ΔQ=·2191×395—47·3130—45·2130	
„	ΔQ=·2442×500—71·6325=50·4675	—1·28
61°28′N 3°42′W.	ΔQ=·2582×500—74·0805—55·0195	
„	ΔQ=·2561×490—71·5565=53·9325	+1·97
61°21′N 3°10′W.	ΔQ=·2321×490—66·7865=46·9425	
„	ΔQ=·2105×405—47·9815=37·2710	+2·77
61°14′N 2°40′W.	ΔQ=·1745×405—43·2510=27·4215	
„	ΔQ=·1806×455—52·1237—30·0493	—4·82
61°08′N 2°10′W.	ΔQ=·2388×455—61·5360=47·1180	
„	ΔQ=·2099×375—43·5480=35·1645	—1·44
61°01′N 1°36′W.	ΔQ=·2386×375—49·2190=40·2560	
„	ΔQ=·1105×145— 8·2725= 7·7500	+0·23
60°56′N 1°00′W.	ΔQ=·1032×145— 8·0250= 6·9390	
		—3·88

1937

NOLSØ, FAROE—FLUGGA, SHETLAND
F.R.S. *EXPLORER*
21-23 May, 1937

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
W. 0-1.		62°00′N 6°12′W				23.5.37
		91 m.				0045-0115
0	8·12	35·29	27·50	60		
10	·12	·27	·49	61	·0060	
20	7·82	·27	·53	57	·0119	
30	·82	·28	·54	56	·0175	
40	·64	·26	·55	56	·0231	
60	·60	·28	·57	54	·0341	
[80]				55	·0450	
86	·56	·26	·56	55		
[100]				55	·0560	
[185]				50	·1006	9·4980
SW. 2.		61°54′N 5°45′W				22.5.37
		276 m.				1945-2100
0	8·04	35·27	27·50	60		
10	7·87	·25	·51	59	·0060	
20	·75	·26	·53	57	·0118	
30	·68	·26	·55	55	·0174	
40	·25	·26	·61	50	·0226	
60	6·89	·26	·66	46	·0322	
80	·79	·26	·67	45	·0413	
100	·60	·26	·70	42	·0500	
[185]				41	·0853	8·4112
[200]	·37	·26	·73	41	·0915	
[215]				41	·0977	11·1580
250	·33	·26	·73	42		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SSW. 2.			61°49′N 5°21′W			22.5.37
			155 m.			1725-1820
0	8·69	35·31	27·43	66		
10	·53	·31	·45	65	·0066	
20	·41	·31	·47	63	·0130	
30	·37	·32	·49	61	·0192	
40	·30	·31	·49	61	·0253	
60	·13	·29	·50	61	·0375	
80	7·71	·29	·56	55	·0491	
100	·57	·29	·58	54	·0600	
150	·04	·26	·63	50		
[200]				52	·1130	
[215]				52	·1208	13·5030
[240]				51	·1336	16·6815
SE. 1.			61°42′N 4°51′W			22.5.37
			320 m.			1250-1410
0	8·67	35·32	27·44	65		
10	·54	·31	·45	65	·0065	
20	·53	·31	·45	65	·0130	
30	·34	·31	·48	62	·0194	
40	·05	·31	·52	58	·0254	
60	·00	·32	·54	57	·0369	
80	7·88	·31	·55	56	·0482	
100	·82	·32	·57	55	·0593	
200	·39	·31	·62	52	·1128	
[240]				51	·1334	16·5740
280	·05	·28	·65	50		
[300]				48	·1628	
[400]				35	·2043	
[500]				11	·2273	
[590]				5	·2345	86·1460
E. 7.			61°28′N 3°42′W			22.5.37
			ca. 1400 m.			0535-0735
0	8·61	35·31	27·44	65		
10	·61	·30	·43	66	·0066	
20	·61	·30	·43	67	·0132	
30	·10	·31	·52	58	·0194	
40	7·95	·31	·54	57	·0252	
60	·92	·31	·55	56	·0365	
80	·89	·32	·56	55	·0476	
100	·88	·31	·55	57	·0588	
200	6·92	·28	·67	47	·1108	
300	5·77	·26	·80	36	·1523	
400	4·98	·14	·81	35	·1878	
[490]				24	·2144	59·7790
[500]				25	·2178	
[590]				14	·2354	82·3540
600	2·96	·15	28·03	14		
E. 5.			61°21′N 3°10′W			22.5.37
			ca. 1400 m.			0035-0335
0	6·07	35·27	27·78	33		
10	·06	·25	·76	35	·0034	
20	·00	·25	·77	34	·0068	
30	5.56	·25	·82	30	·0100	
40	·00	·25	·89	23	·0126	
60	4·14	·22	·97	16	·0165	
80	3·44	·18	28·00	13	·0194	
100	2·70	·18	·07	6	·0213	
200	·66	34·97	27·91	22	·0353	
300	1·66	·95	·98	15	·0538	
400	0·62	·93	28·04	9	·0658	
[470]				8	·0718	19·4030
[490]				8	·0734	20·8510

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
E/N. 6.			61°14′N 2°40′W			21.5.37
			1100 m.			1950-2235
0	9·45	35·42	27·39	70		
10	·44	·42	·39	70	·0070	
20	·46	·37	·35	74	·0142	
30	·11	·35	·39	71	·0214	
40	8·71	·40	·50	60	·0280	
60	·58	·39	·51	60	·0400	
80	·34	·35	·51	60	·0520	
100	·29	·35	·52	60	·0640	
200	7·44	·35	·65	49	·1185	
300	6·55	·35	·77	39	·1625	
400	5·45	·17	·78	39	·2015	
[470]				29	·2253	59·6390
[500]	2·95	34·99	·90	25	·2335	
[595]				13	·2515	89·4785
E. 6.			61°08′N 2°10′W			21.5.37
			450 m.			1655-1800
0	9·78	35·43	27·34	75		
10	·76	·44	·36	73	·0074	
20	·69	·43	·36	73	·0147	
30	·48	·43	·39	71	·0219	
40	·46	·44	·40	70	·0289	
60	·42	·43	·40	71	·0430	
80	8·79	·40	·48	63	·0564	
100	·71	·35	·46	65	·0692	
200	7·98	·36	·58	56	·1297	
300	·08	·30	·66	50	·1827	
[315]				49	·1901	31·9145
400	6·39	·26	·73	44	·2297	
[500]				42	·2727	
[595]				39	·3112	102·5937
E/S. 3.			61°01′N 1°36′W			21.5.37
			179 m.			1300-1445
0	9·81	35·43	27·34	75		
10	·81	·43	·34	75	·0075	
20	·72	·43	·35	74	·0149	
30	·50	·40	·37	73	·0223	
40	·12	·39	·42	68	·0293	
60	8·81	·40	·48	63	·0424	
80	·56	·40	·52	59	·0546	
100	·24	·39	·56	56	·0661	
150	7·79	·33	·58	55	·0939	7·4875
170	·77	·33	·59	55		
[200]				55	·1214	
[300]				53	·1754	
[315]				52	·1833	30·4002
SE/E. 3.			60°56′N 1°00′W			21.5.37
			120 m.			1045-1120
0	9·79	35·43	27·34	75		
10	·79	·43	·34	75	·0075	
20	·63	·43	·37	72	·0149	
30	·09	·43	·46	64	·0217	
40	8·88	·44	·50	60	·0279	
60	·59	·39	·51	60	·0399	
80	·27	·39	·56	56	·0515	
[100]	7·77	·37	·61	51	·0622	
116	·41	·34	·65	47		
[150]				52	·0880	7·0645

VOLUME TRANSPORT

		Km³/hr
62°00′N 6°12′W.	ΔQ=·1006×185− 9·4980= 9·1130	+0.49
61°45′N 5°45′W.	ΔQ=·0853×185− 8·4112= 7·3693	
„	ΔQ=·0977×215− 11·1580= 9·8475	−0·73
61°49′N 5°21′W.	ΔQ=·1208×215− 13·5030=12·4690	
„	ΔQ=·1336×240− 16·6815=15·3825	−0.02
61°42′N 4°51′W.	ΔQ=·1334×240− 16·5740=15·4420	
„	ΔQ=·2345×590− 86·1460=52·2090	−1·21
61°28′N 3°42′W.	ΔQ=·2354×590− 82·3540=56·5320	
„	ΔQ=·2144×490− 59·7790=45·2770	+8·48
61°21′N 3°10′W.	ΔQ=·0734×490− 20·8510=15·1150	
„	ΔQ=·0718×470− 19·4030=14·3430	−9·76
61°14′N 2°40′W.	ΔQ=·2253×470− 59·6390=46·2520	
„	ΔQ=·2515×595− 89·4785=60·1640	−6·32
61°08′N 2°10′W.	ΔQ=·3112×595−102·5937=82·5703	
„	ΔQ=·1901×315− 71·9145=27·9670	+0·18
61°01′N 1°36′W.	ΔQ=·1833×315− 30·4002=27·3393	
„	ΔQ=·0939×150− 7·4875= 6·5975	+0·13
60°56′N 1°00′W.	ΔQ=·0880×150− 7·0645= 6·1355	
		−8·76

FAROE BANK—BUTT OF LEWIS
F.R.S. *EXPLORER*
28-30 May, 3 June, 1937

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SE. 5.			60°54′N 8°16′W			28.5.37
			213 m.			1510-1620
0	9·60	35·35	27·31	78		
10	·62	·38	·33	76	·0077	
20	·53	·35	·32	77	·0153	
30	·54	·35	·32	77	·0230	
40	·31	·35	·36	74	·0306	
60	8·74	·35	·45	66	·0446	
80	·73	·34	·44	67	·0579	
100	·73	·38	·48	64	·0710	
200	·35	·33	·50	63	·1345	
[300]				63	·1975	
[400]				55	·2565	
[500]				43	·3055	
[550]				35	·3250	97·1165
SE/S. 6.			60°35′N 8°00′W			28.5.37
			869 m.			2220-2340
0	9·92	35·36	27·26	82		
10	·92	·36	·26	83	·0082	
20	·90	·36	·27	82	·0164	
30	·70	·35	·29	80	·0245	
40	·40	·36	·35	75	·0323	
60	8·99	·37	·43	67	·0465	
80	·91	·37	·44	67	·0599	
100	·92	·37	·44	67	·0733	
200	·71	·38	·48	65	·1393	
300	·51	·35	·49	66	·2048	
400	·15	·35	·54	63	·2693	
[500]	6·90	·24	·65	63	·3278	
[550]	4·92	·12	·80	54	·3508	102·1965
600	2·51	·02	·96	20		

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SE/S. 4.			60°12′N 7°40′W			29.5.37
			660 m.			0315-0505
0	9·61	35·35	27·31	78		
10	·57	·35	·32	77	·0078	
20	·22	·35	·37	72	·0152	
30	8·79	·32	·42	68	·0222	
40	·64	·34	·46	64	·0288	
60	·32	·35	·52	59	·0411	
80	·03	·32	·54	57	·0527	
100	7·87	·35	·59	53	·0637	
200	6·72	·26	·68	46	·1132	
300	5·31	·17	·79	36	·1542	
400	3·70	·08	·90	25	·1847	
[500]	1·82	·00	28·01	12	·2032	
[550]	0·96	34·96	·04	10	·2087	72·2495
600	·22	·92	·05	8		
S/E. 4.			59°56′N 7°27′W			29.5.37
			1043 m.			0810-1020
0	10·50	35·41	27·20	88		
10	·47	·41	·21	87	·0088	
20	·41	·41	·22	87	·0175	
30	·25	·42	·25	84	·0261	
40	9·73	·42	·34	76	·0341	
60	·57	·42	·37	73	·0490	
80	·53	·44	·39	72	·0635	
100	·53	·44	·39	72	·0779	
200	·31	·44	·43	70	·1489	
300	·07	·41	·45	70	·2189	
400	8·78	·38	·47	70	·2889	
[500]	·43	·37	·51	68	·3579	
[550]	·17	·37	·56	64	·3909	110·2445
600	7·79	·35	·60			
SSW. 5.			59°44′N 7°15′W			29.5.37
			650 m.			1250-1455
0	10·48	35·42	27·21	87		
10	·23	·43	·26	83	·0085	
20	·09	·43	·29	80	·0167	
30	9·87	·43	·33	76	·0245	
40	·87	·43	·33	77	·0321	
60	·75	·44	·36	74	·0472	
80	·66	·44	·37	74	·0620	
100	·59	·43	·37	74	·0768	
200	·81	·44	·35	78	·1528	
300	·96	·44	·32	83	·2333	
355				79	·2779	48·7735
400	·12	·39	·42	75	·3123	
[500]	8·79	·37	·46	73	·3863	
[550]	·69	·37	·48	72	·4225	117·1455
600	8·62	·37	·49	72		
SW. 6.			59°17′N 6°53′W			30.5.37
			160 m.			0415-0450
0	10·89	35·41	27·13	95		
10	·89	·40	·12	96	·0096	
20	·90	·40	·12	96	·0196	
30	·66	·40	·16	93	·0290	
40	·48	·40	·20	89	·0381	
60	·28	·42	·26	84	·0554	
80	9·35	·42	·41	70	·0708	
100	·16	·42	·44	67	·0845	
[145]				67	·1147	9·0045
150	8·96	·39	·45	67	·1180	
[200]				68	·1518	
[300]				74	·2228	
[355]				74	·2635	48·4457

SW. 6. 59°00′N 6°40′W 30.5.37
133 m. 0950-1100

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·16	35·40	27·08	99		
10	·16	·36	·04	103	·0101	
20	·13	·36	·05	103	·0204	
30	10·91	·35	·08	100	·0306	
40	·25	·36	·21	88	·0400	
60	9·59	·35	·31	79	·0567	
80	·01	·28	·35	75	·0721	
100	8·95	·28	·36	75	·0871	
125	·95	·28	·36	76		
[130]				76	·1097	7·6100
[145]				70	·1197	9·3110

SSE. 4. 58°40′N 6°10′W 3.6.37
124 m. 1515-1620

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·06	34·79	26·80	126		
10	·05	·79	·80	126	·0126	
20	9·72	·76	·83	124	·0251	
30	·72	·78	·85	122	·0374	
40	·78	·81	·85	122	·0496	
60	8·75	·72	·96	112	·0730	
80	7·50	·75	27·17	92	·0934	
100	·28	·76	·21	89	·1114	
120	·33	·79	·22	88		
[130]				88	·1380	9·6860

VOLUME TRANSPORT

		Km³/hr.
60°54′N 8°16′W.	$\Delta Q = \cdot3250 \times 550 - 97\cdot1165 = 81\cdot6335$	
60°35′N 8°00′W.	$\Delta Q = \cdot3508 \times 550 - 102\cdot1965 = 90\cdot7435$	− 2·58
60°12′N 7°40′W.	$\Delta Q = \cdot2087 \times 550 - 72\cdot2495 = 42\cdot5355$	+13·69
59°56′N 7°27′W.	$\Delta Q = \cdot3909 \times 550 - 110\cdot2445 = 104\cdot7505$	−17·72
59°44′N 7°15′W.	$\Delta Q = \cdot4225 \times 550 - 117\cdot1455 = 115\cdot2295$	− 2·99
„	$\Delta Q = \cdot2779 \times 355 - 48\cdot7735 = 49\cdot8810$	
59°17′N 6°53′W.	$\Delta Q = \cdot2635 \times 355 - 48\cdot4457 = 45\cdot0968$	+ 1·37
„	$\Delta Q = \cdot1147 \times 145 - 9\cdot0045 = 7\cdot6270$	
59°00′N 6°40′W.	$\Delta Q = \cdot1197 \times 145 - 9\cdot3110 = 8\cdot0455$	− 0·12
„	$\Delta Q = \cdot1097 \times 130 - 7\cdot6100 = 6\cdot6510$	
58°40′N 6°10′W.	$\Delta Q = \cdot1380 \times 130 - 9\cdot6860 = 8\cdot2540$	− 0·46
		−8·81

1938

NOLSØ, FAROE—FLUGGA, SHETLAND

Danish Research Vessel, *DANA*
3-4 May, 1938

62°00′N 6°12′W 4.5.38
126 m. 0850-0920

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	7·41	35·26	27·58	52		
10	·40	·26	·58	52	·0052	
25	·40	·26	·58	52	·0130	
50	·40	·27	·59	52	·0260	
75	·40	·26	·58	53	·0391	
100	·41	·26	·58	54	·0525	
124	·42	·25	·58	54		
[155]				51	·0814	6·2910

61°49′N 5°21′W 4.5.38
185 m. 0423-0505

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	7·79	35·27	27·54	56		
10	·64	·27	·56	54	·0055	
25	·36	·26	·59	52	·0135	
50	·16	·26	·63	48	·0260	
75	·11	·26	·63	49	·0381	
100	·10	·26	·63	49	·0503	
150	·06	·26	·64	49	·0748	
[155]				49	·0773	5·9507
175	·06	·26	·64	49		
[200]				49	·0993	
[290]				46	·1421	20·7847

61°42′N 4°51′W 4.5.38
450 m. 0048-0135

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	7·93	35·30	27·54	56		
10	·93	·30	·54	56	·0056	
25	·91	·31	·56	54	·0138	
50	·72	·30	·57	54	·0273	
75	·63	·27	·57	54	·0408	
100	·48	·27	·59	53	·0542	
150	·28	·26	·61	52	·0804	
200	·10	·25	·63	51	·1062	
[290]				45	·1494	22·3180
300	5·87	·13	·71	44	·1537	23·8110
400	3·80	34·99	·83	32	·1917	

61°35′N 4°15′W 3.5.38
1175 m. 2050-2200

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·16	35·35	27·54	56		
10	7·85	·31	·56	54	·0055	
25	·47	·27	·59	52	·0135	
50	·07	·26	·64	47	·0259	
75	6·55	·23	·68	44	·0373	
100	·22	·21	·72	40	·0478	
150	5·19	·10	·75	38	·0673	
200	3·76	·00	·82	31	·0845	
300	2·32	34·94	·93	21	·1105	18·9388
400	0·82	·93	28·03	10	·1260	
[440]				8	·1296	35·8758
600	–0·36	·94	·10	2		

61°21′N 3°10′W 3.5.38
1290 m. 1421-1535

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·20	35·46	27·46	63		
10	·20	·45	·46	64	·0064	
25	·16	·45	·46	64	·0160	
50	·02	·44	·48	63	·0319	
75	8·89	·43	·49	62	·0475	
100	·76	·39	·48	64	·0633	
150	·64	·40	·50	63	·0951	
200	·14	·35	·54	60	·1259	
300	7·26	·25	·61	54	·1829	
400	6·28	·19	·69	48	·2339	
[440]				40	·2515	58·6493
[500]	4·03	·09	·88	29	·2724	
[570]				15	·2878	93·8633
600	0·61	34·93	28·04	9		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
			61°08′N 2°10′W 530 m.			3.5.38 1030-1100
0	9·23	35·44	27·44	65		
10	·24	·44	·44	66	·0066	
25	8·92	·40	·46	64	·0164	
50	·73	·40	·49	62	·0322	
75	·54	·39	·51	60	·0474	
100	·39	·37	·52	60	·0624	
150	7·84	·31	·57	56	·0914	
200	·46	·28	·60	54	·1189	
300	·08	·25	·62	53	·1724	
[345]				52	·1960	35·1370
400	6·29	·16	·67	50	·2239	
500	5·54	·12	·73	45	·2714	
[570]				33	·2987	91·3815
			61°01′N 1°36′W 159 m.			3.5.38 0730-0801
0	9·23	35·43	27·43	66		
10	·23	·44	·44	66	·0066	
25	·23	·44	·44	66	·0165	
50	·23	·44	·44	66	·0330	
65	·23	·44	·44	67	·0430	
87	·23	·45	·45	66	·0576	
125	·23	·44	·44	68	·0831	
[130]				68	·0865	5·5989
[200]				54	·1292	
[300]				53	·1827	
[345]				52	·2063	37·3559
			60°53′N 1°06′W 105 m.			3.5.38 0519-0542
0	9·00	35·42	27·47	62		
10	8·98	·42	·47	63	·0062	
25	·97	·42	·47	63	·0156	
50	·88	·46	·52	59	·0308	
75	·64	·43	·53	58	·0454	
100	·55	·41	·53	59	·0600	
[130]				59	·0777	5·1100

VOLUME TRANSPORT

		Km³/hr.
62°00′N 6°12′W.	ΔQ=·0814×155− 6·2910= 6·3260	−0·08
61°49′N 5°21′W.	ΔQ=·0773×155− 5·9507= 6·0308	
”	ΔQ=·1421×290−20·7847=20·4243	−0·16
61°42′N 4°51′W.	ΔQ=·1494×290−22·3180=21·0080	
”	ΔQ=·1537×300−23·8110=22·2990	+2.27
61°35′N 4°15′W.	ΔQ=·1105×300−18·9388=14·2112	
”	ΔQ=·1296×440−35·8758=21·1482	−8·67
61°21′N 3°10′W.	ΔQ=·2515×440−58·6493=52·0107	
”	ΔQ=·2878×570−93·8633=70·1827	−2·45
61°08′N 2°10′W.	ΔQ=·2987×570−91·3815=78·8775	
”	ΔQ=·1960×345−35·1370=32·4830	−0·38
61°01′N 1°36′W.	ΔQ=·2063×345−37·3559=33·8176	
”	ΔQ=·0865×130− 5·5989= 5·6461	+0·18
60°53′N 1°06′W.	ΔQ=·0777×130− 5·1100= 4·9910	
		−9·29

FAROE BANK—BUTT OF LEWIS

F.R.S. *EXPLORER*

26-27 June, 2-3 July, 1938

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
WNW. 1.			60°54′N 8°16′W 120 m.			3.7.38 0120-0215
0	9·44	35·37	27·35	74		
10	·44	·40	·37	72	·0073	
20	·34	·34	·34	75	·0147	
30	·33	·40	·39	71	·0220	
40	·34	·40	·39	71	·0291	
60	·34	·34	·34	76	·0438	
80	·33	·35	·35	76	·0590	
100	·33	·35	·35	76	·0742	
115	·33	·42	·41	71	·0852	
[200]				60	·1532	
[300]				51	·2087	
[400]				43	·2557	
[500]				30	·2922	
[550]				25	·3060	98·7095
NW. 2.			60°35′N 8°00′W 700 m.			2.7.38 1820-1910
0	9·73	35·35	27·29	80		
10	·71	·35	·29	80	·0080	
20	·69	·36	·30	79	·0160	
30	·69	·36	·30	79	·0239	
40	·67	·36	·31	79	·0318	
60	·50	·41	·37	73	·0470	
80	·36	·37	·37	74	·0617	
100	·30	·37	·38	73	·0764	
200	8·59	·46	·56	58	·1419	
[300]	7·45	·35	·66	50	·1959	
400	6·15	·26	·76	41	·2414	
[500]	4·90	·21	·88	30	·2769	
[550]	·43	·19	·92	26	·2909	93·6740
600	3·89	·17	·96	22		
680	1·24	·01	28·06	9		
N/W. 3.			60°12′N 7°40′W 590 m.			2.7.38 1315-1430
0	9·79	35·38	27·30	79		
10	·78	·38	·30	79	·0079	
20	·77	·38	·30	79	·0158	
30	·72	·38	·31	78	·0237	
40	·69	·38	·32	78	·0315	
60	·57	·37	·33	77	·0470	
80	·55	·37	·33	78	·0625	
100	·44	·37	·35	76	·0779	
200	8·98	·37	·43	70	·1509	
[300]	·59	·36	·48	67	·2194	
400	·23	·30	·49	68	·2869	
[500]	7·28	·24	·60	59	·3504	
[550]	6·63	·22	·67	52	·3782	109·2655
580	·23	·20	·70	49		
N/W. 3.			59°56′N 7°27′W 720 m.			2.7.38 0925-1045
0	10·32	35·45	27·26	82		
10	·34	·44	·25	84	·0083	
20	·28	·44	·27	82	·0166	
30	·27	·39	·23	86	·0250	
40	·27	·39	·23	86	·0336	
60	9·96	·39	·28	82	·0504	
80	·61	·39	·34	77	·0663	
100	·73	·40	·33	78	·0818	
200	·18	·39	·41	72	·1568	
[300]	8·91	·39	·45	70	·2278	
400	·84	·39	·47	70	·2978	
[500]	·83	·39	·47	72	·3688	
[550]	·82	·39	·47	73	·4050	114·2700
600	·82	·39	·47	75		

ESE. 7. 59°44′N 7°15′W 27.6.38
1060 m. 0440-0555

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·52	35·44	27·22	86		
10	·53	·46	·23	85	·0086	
20	·53	·44	·22	87	·0172	
30	·53	·46	·23	86	·0258	
40	·47	·44	·23	86	·0344	
60	·44	·44	·23	87	·0517	
80	9·76	·47	·38	73	·0677	
100	10·00	·45	·32	79	·0829	
200	9·57	·47	·41	72	·1584	
[300]	·23	·46	·46	70	·2294	
400	·09	·45	·48	70	·2994	
[500]	·01	·45	·49	71	·3699	
[550]	8·98	·44	·49	72	·4057	114·9990
600	·98	·44	·49	73		

ESE. 4. 59°31′N 7°05′W 27.6.38
1040 m. 0050-0245

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	11·01	35·41	27·11	97		
10	10·94	·45	·16	92	·0094	
20	·64	·44	·20	88	·0184	
30	·55	·44	·22	87	·0272	
40	·24	·43	·26	83	·0357	
60	9·81	·45	·35	75	·0515	
80	·72	·45	·37	74	·0664	
100	·63	·46	·39	72	·0810	
200	·35	·45	·43	70	·1520	
[300]	·18	·45	·46	70	·2220	
400	·09	·45	·48	70	·2920	
[500]	8·99	·45	·49	71	·3625	
[550]	·96	·43	·48	73	·3985	112·0535
600	·95	·41	·47	75		

ESE. 3. 59°17′N 6°53′W 26.6.38
500 m. 2200-2247

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	11·40	35·41	27·04	103		
10	·38	·44	·07	101	·0102	
20	·13	·42	·10	98	·0202	
30	·04	·46	·15	94	·0298	
40	10·84	·46	·18	91	·0390	
60	·44	·47	·26	84	·0565	
80	·39	·52	·31	80	·0729	
100	·29	·48	·30	81	·0890	
200	9·90	·46	·35	78	·1685	
[300]	·75	·47	·38	78	·2465	
[350]				78	·2855	51·5900
400	·70	·48	·40	78	·3245	
[500]				75	·4010	
[550]				75	·4385	124·1025

NW. 3. 59°00′N 6°40′W 26.6.38
151 m. 1855-1935

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	11·34	35·39	27·04	103		
10	·26	·28	26·97	110	·0106	
20	10·94	·35	27·08	100	·0211	
30	·80	·35	·10	98	·0310	
40	·86	·41	·14	95	·0406	
60	·30	·44	·27	83	·0584	
80	9·96	·38	·28	82	·0749	
100	·73	·42	·35	76	·0907	
[130]				76	·1135	5·8300
145	·62	·42	·37	75		
[200]				75	·1662	
[300]				76	·2417	
[350]				76	·2797	51·0840

NW. 2-3. 58°40′N 6°10′W 26.6.38
114 m. 1320-1415

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	11·32	35·15	26·85	121		
10	·14	·19	·92	115	·0118	
20	·03	·24	·98	109	·0230	
30	10·81	·23	27·01	107	·0338	
40	·85	·35	·10	98	·0440	
60	·82	·34	·09	100	·0638	
80	·78	·31	·08	101	·0839	
110	9·81	·33	·26	85	·1118	
[130]				80	·1283	8·7975

Volume Transport

Km³/hr

60°54′N 8°16′W. $\Delta Q = {\cdot}3060 \times 550 - 98{\cdot}7095 = 69{\cdot}5905$

+ 0·93

60°35′N 8°00′W. $\Delta Q = {\cdot}2909 \times 550 - 93{\cdot}6740 = 66{\cdot}3210$

− 9·21

60°12′N 7°40′W. $\Delta Q = {\cdot}3782 \times 550 - 109{\cdot}2655 = 98{\cdot}7445$

− 2·77

59°56′N 7°27′W. $\Delta Q = {\cdot}4050 \times 550 - 114{\cdot}2700 = 108{\cdot}4800$

+ 0·10

59°44′N 7°15′W. $\Delta Q = {\cdot}4057 \times 550 - 114{\cdot}9990 = 108{\cdot}1360$

+ 0·29

59°31′N 7°05′W. $\Delta Q = {\cdot}3985 \times 550 - 112{\cdot}0535 = 107{\cdot}1215$

− 2·85

59°17′N 6°53′W. $\Delta Q = {\cdot}4385 \times 550 - 124{\cdot}1025 = 117{\cdot}0725$

" $\Delta Q = {\cdot}2855 \times 350 - 51{\cdot}5900 = 48{\cdot}3350$
59°00′N 6°40′W. $\Delta Q = {\cdot}2797 \times 350 - 51{\cdot}0840 = 46{\cdot}8110$

+ 0·44

" $\Delta Q = {\cdot}1135 \times 130 - 5{\cdot}8300 = 8{\cdot}9250$
58°40′N 6°10′W. $\Delta Q = {\cdot}1283 \times 130 - 8{\cdot}7975 = 7{\cdot}8815$

+ 0·30

−12·77

NOLSØ, FAROE—FLUGGA, SHETLAND

F.R.S. *EXPLORER*
5-6 July, 1938

NE. 2. 62°00′N 6°12′W 5.7.38
110 m. 0420-0438

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	9·12	35·28	27·34	75		
10	8·75	·49	·56	54	·0064	
20	·66	·24	·38	71	·0126	
30	·67	·28	·41	69	·0196	
40	·67	·27	·40	70	·0266	
60	·68	·27	·40	70	·0406	
80	·75	·28	·39	72	·0548	
105	·69	·28	·40	71	·0727	
[175]				52	·1157	10·3328

NE. 5. 61°54′N 5°45′W 5.7.3.8
245 m. 0620-0645

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	9·70	35·29	27·25	83		
10	·56	·35	·32	77	·0080	
20	·20	·35	·38	71	·0154	
30	·14	·35	·39	71	·0225	
40	·11	·34	·38	72	·0297	
60	8·91	·34	·42	68	·0437	
80	·70	·35	·46	65	·0570	
100	·24	·35	·53	59	·0694	
[175]				51	·1106	10·3625
[200]	7·46	·35	·66	48	·1229	
[215]				47	·1300	15·1243
240	·29	·35	·69	46		

NE. 3. 61°49′N 5°21′W 5.7.38
180 m. 0825-0900

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_o^{z_1}\Delta D dz$
0	9·74	35·30	27·25	83		
10	·61	·30	·27	82	·0082	
20	·25	·31	·34	75	·0160	
30	·11	·31	·36	74	·0234	
40	8·87	·31	·40	70	·0306	
60	·43	·31	·47	64	·0440	
80	·27	·31	·49	62	·0566	
100	·02	·32	·54	58	·0686	
175	7·78	·31	·58	55	·1110	
[200]				53	·1245	
[210]				50	·1297	14·5828
[215]				49	·1321	15·2363

NE. 2. 61°42′N 4°51′W 5.7.38
240 m. 1105-1135

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_o^{z_1}\Delta D dz$
0	9·84	35·30	27·23	85		
10	·53	·31	·29	80	·0082	
20	·26	·32	·34	75	·0160	
30	·14	·31	·35	74	·0234	
40	·07	·32	·38	72	·0307	
60	8·31	·34	·51	60	·0439	
80	·87	·34	·42	69	·0568	
100	·54	·35	·48	64	·0701	
[200]	7·95	·33	·56	58	·1311	
[210]				57	·1369	15·0515
230	·85	·31	·57	55		
[300]				41	·1806	
[400]				23	·2126	
[445]				13	·2207	58·7057

NE. 2. 61°35′N 4°15′W 5.7.35
840 m. 1345-1455

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_o^{z_1}\Delta D dz$
0	10·74	35·34	27·10	98		
10	·04	·38	·26	83	·0090	
20	9·94	·36	·26	83	·0173	
30	·72	·34	·28	81	·0255	
40	·61	·40	·35	75	·0333	
60	·24	·48	·47	64	·0472	
80	8·41	·36	·51	60	·0596	
100	·68	·34	·45	66	·0722	
200	7·56	·32	·62	52	·1312	
[300]	6·33	·25	·67	48	·1812	
400	4·44	·08	·83	33	·2217	
[445]				22	·2341	60·0660
[500]	1·03	34·99	28·06	8	·2422	
[545]				7	·2456	83·9810
600	0·28	·96	·08	5		
800	–0·59	·97	·13	–1		

NE. 1-2. 61°28′N 3°42′W 5.7.38
1280 m. 1705-1830

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_o^{z_1}\Delta D dz$
0	11·90	35·34	26·89	117		
10	·00	·32	27·04	103	·0110	
20	10·50	·32	·13	95	·0209	
30	·22	·32	·18	91	·0302	
40	9·94	·32	·23	86	·0390	
60	·05	·32	·38	72	·0548	
80	8·28	·37	·54	57	·0677	
100	·03	·31	·53	59	·0793	
200	7·77	·35	·61	53	·1353	
[300]	·28	·24	·59	56	·1898	
400	5·33	·12	·76	40	·2378	
[500]	3·12	·05	·94	22	·2688	78·1440
[545]				15	·2771	90·4268
600	0·97	·00	28·08	6		

NE. 1-2. 61°21′N 3°10′W 5.7.38
1405 m. 2040-2215

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_o^{z_1}\Delta D dz$
0	11·41	35·39	27·02	105		
10	10·94	·37	·09	99	·0102	
20	·26	·35	·20	88	·0196	
30	·04	·35	·24	85	·0282	
40	9·51	·39	·36	74	·0362	
60	8·86	·30	·39	71	·0507	
80	·54	·34	·47	64	·0642	
100	·08	·30	·52	60	·0766	
200	7·60	·30	·59	55	·1341	
[300]	6·02	·18	·72	43	·1831	
[365]				31	·2071	43·2635
400	3·04	34·99	·90	29	·2171	
[500]	1·13	·99	28·05	9	·2341	73·1520
600	0·20	·99	·11	2		

NE. 3. 61°14′N 2°40′W 6.7.38
1190 m. 0015-0125

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_o^{z_1}\Delta D dz$
0	10·94	35·29	27·03	104		
10	·89	·28	·03	104	·0104	
20	9·85	·31	·24	85	·0198	
30	·49	·27	·27	82	·0282	
40	·31	·33	·34	76	·0361	
60	8·34	·31	·48	63	·0500	
80	·21	·28	·48	63	·0626	
100	7·95	·31	·54	58	·0747	
200	·44	·26	·59	55	·1312	
[300]	6·74	·08	·54	61	·1892	
[365]				36	·2207	43·7613
400	2·49	34·94	·91	23	·2212	
[485]				14	·2369	70·4287
[500]	0·16	·93	28·01	13		

N. 3. 61°08′N 2°10′W 6.7.38
652 m. 0320-0430

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_o^{z_1}\Delta D dz$
0	11·04	35·08	26·85	121		
10	·01	·41	27·11	97	·0109	
20	10·63	·39	·16	92	·0201	
30	·24	·41	·25	84	·0289	
40	·24	·39	·23	86	·0374	
60	9·96	·59	·44	67	·0527	
80	·75	·47	·38	73	·0667	
100	·82	·48	·37	74	·0814	
200	8·97	·39	·45	68	·1524	
[300]	7·43	·38	·69	47	·2099	
[385]				39	·2465	53·5640
400	6·58	·37	·80	38	·2524	
[485]				35	·2834	70·0535
[500]	5·09	·19	·84	34	·2884	
[600]	–0·60	·00	28·16	–4		

N. 3. 61°01′N 1°36′W 6.7.38
169 m. 0755-0822

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_o^{z_1}\Delta D dz$
0	11·44	35·50	27·10	98		
10	·44	·44	·05	102	·0100	
20	·34	·44	·07	101	·0202	
30	10·86	·44	·16	93	·0299	
40	·76	·45	·19	90	·0391	
60	·27	·44	·27	83	·0564	
80	9·75	·44	·35	76	·0723	
100	·72	·44	·36	75	·0874	
[155]				69	·1270	10·5315
160	·23	·44	·44	69		
[200]				68	·1589	
[300]				61	·2234	
[385]				51	·2710	57·0775

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
NNW. 2-3.			60°56′N 1°00′W			6.7.38
			140 m.			1205-1235
0	11·21	35·44	27·10	98		
10	·09	·44	·12	96	·0097	
20	10·95	·43	·14	94	·0192	
30	·66	·43	·19	90	·0284	
40	·34	·43	·24	85	·0372	
60	9·55	·44	·39	71	·0528	
[80]		·44		60	·0659	
[100]		·44		50	·0769	
[135]		·44		34		
[155]				50	·1044	9·2598

Volume Transport

		Km³/hr
62°00′N 6°12′W.	$\Delta Q={\cdot}1157\times 175-10{\cdot}3328=9{\cdot}9137$	+0·26
61°54′N 5°45′W.	$\Delta Q={\cdot}1106\times 175-10{\cdot}3625=8{\cdot}9925$	
”	$\Delta Q={\cdot}1300\times 215-15{\cdot}1243=12{\cdot}8257$	−0·10
61°49′N 5°21′W.	$\Delta Q={\cdot}1321\times 215-15{\cdot}2363=13{\cdot}1652$	
”	$\Delta Q={\cdot}1297\times 210-14{\cdot}5828=12{\cdot}6542$	−0·29
61°42′N 4°51′W.	$\Delta Q={\cdot}1369\times 210-15{\cdot}0515=13{\cdot}6975$	
”	$\Delta Q={\cdot}2207\times 445-58{\cdot}7057=39{\cdot}5058$	−1·29
61°35′N 4°15′W.	$\Delta Q={\cdot}2341\times 445-60{\cdot}0660=44{\cdot}1085$	
”	$\Delta Q={\cdot}2456\times 545-83{\cdot}9810=49{\cdot}8710$	−3·01
61°28′N 3°42′W.	$\Delta Q={\cdot}2771\times 545-90{\cdot}4268=60{\cdot}5927$	
”	$\Delta Q={\cdot}2688\times 500-78{\cdot}1440=56{\cdot}2560$	+3·48
61°21′N 3°10′W.	$\Delta Q={\cdot}2341\times 500-73{\cdot}1520=43{\cdot}8980$	
”	$\Delta Q={\cdot}2071\times 365-43{\cdot}2635=32{\cdot}3280$	−1·26
61°14′N 2°40′W.	$\Delta Q={\cdot}2207\times 365-43{\cdot}7613=36{\cdot}7942$	
”	$\Delta Q={\cdot}2369\times 485-70{\cdot}4287=44{\cdot}4678$	−6·46
61°08′N 2°10′W.	$\Delta Q={\cdot}2834\times 485-70{\cdot}0535=67{\cdot}3955$	
”	$\Delta Q={\cdot}2465\times 385-53{\cdot}5640=41{\cdot}3385$	−1·67
61°01′N 1°36′W.	$\Delta Q={\cdot}2710\times 385-57{\cdot}0775=47{\cdot}2575$	
”	$\Delta Q={\cdot}1270\times 155-10{\cdot}5315=9{\cdot}1535$	+0·74
60°56′N 1°00′W.	$\Delta Q={\cdot}1044\times 155-9{\cdot}2598=6{\cdot}5222$	
		−9·60

1939

NOLSØ, FAROE—FLUGGA, SHETLAND

R.F.S. *EXPLORER*

17-18 June, 1939

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SSE. 5-6.			62°00′N 6°12′W			18.6.39
			122 m.			1125-1215
0	9·07	35·29	27·35	74		
10	·07	·26	·33	76	·0075	
20	·01	·22	·30	79	·0153	
30	8·85	·25	·36	74	·0229	
40	·70	·27	·39	71	·0301	
60	·70	·30	·42	68	·0440	
80	9·10	·25	·32	78	·0586	
[100]	8·92	·25	·34	77	·0741	
115	·71	·24	·37	74		
[185]				60	·1323	12·4735
SE. 6.			61°54′N 5°45′W			18.6.39
			250 m.			0730-0815
0	9·39	35·29	27·30	78		
10	·47	·27	·27	82	·0080	
20	8·90	·26	·36	73	·0158	
30	·90	·26	·36	74	·0232	
40	·88	·26	·36	74	·0306	
60	·59	·29	·43	67	·0447	
80	7·94	·30	·54	57	·0571	
100	·64	·29	·57	55	·0683	
[185]				54	·1146	11·4212
[200]	·48	·29	·60	54	·1228	
[215]				54	·1309	15·1058
240	·46	·29	·60	54		
SE. 5.			61°49′N 5°21′W			18.6.39
			180 m.			0540-0625
0	9·20	35·26	27·30	78		
10	·21	·26	·30	79	·0078	
20	·15	·26	·31	78	·0156	
30	·03	·25	·33	76	·0233	
40	8·70	·28	·40	70	·0306	
60	·11	·29	·50	61	·0437	
80	·05	·29	·51	60	·0558	
100	7·53	·25	·56	56	·0674	
175	·53	·26	·57	56		
[200]				56	·1234	13·1300
[215]				54	·1316	15·0425
SE. 5-6.			61°42·N 4°51′W			18.6.39
			250 m.			0300-0345
0	9·65	35·32	27·28	80		
10	·65	·32	·28	81	·0080	
20	·68	·32	·27	82	·0162	
30	·66	·32	·28	81	·0244	
40	·58	·31	·28	81	·0325	
60	·00	·31	·38	72	·0478	
80	8·59	·32	·45	66	·0616	
100	·89	·32	·41	70	·0752	
[200]	·42	·32	·48	65	·1427	
230	·19	·32	·51	63		
[215]				64	·1524	17·0217
[300]				54	·2022	
[360]				44	·2316	45·0675
SE. 5.			61°35′N 4°15′W			18.6.39
			870 m.			0000-0045
0	9·60	35·31	27·28	80		
10	·60	·30	·27	82	·0081	
20	·38	·32	·32	77	·0161	
30	·26	·32	·34	75	·0237	
40	·20	·32	·35	75	·0312	
60	·02	·30	·36	74	·0461	
80	8·80	·31	·41	70	·0605	
100	9·61	·29	·26	85	·0760	
200	7·77	·30	·56	58	·1475	
[300]	6·87	·20	·62	53	·2030	
[360]				40	·2309	45·5560
[375]				37	·2330	48·8890
400	3·42	34·96	·83	32		
SE. 3.			61°28′N 3°42′W			17.6.39
			1000 m.			2100-2155
0	10·30	35·32	27·16	92		
10	·05	·31	·20	88	·0090	
20	9·40	·32	·32	77	·0172	
30	·32	·32	·33	76	·0248	
40	·29	·32	·34	76	·0324	
60	8·90	·32	·40	70	·0470	
80	·01	·32	·54	57	·0597	
100	7·78	·32	·58	54	·0708	
200	·15	·25	·62	52	·1238	
[300]	6·12	·07	·62	53	·1763	
[355]				33	·1999	38·9185
[375]				26	·2059	42·9055
400	2·02	34·96	·97	17		

SSE. 3. 61°21·N 3°10′W 17.6.39
1310 m. 1800-1900

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	9·99	35·30	27·20	88		
10	·65	·31	·27	82	·0085	
20	·48	·31	·30	79	·0165	
30	·40	·32	·32	77	·0243	
40	·20	·32	·35	75	·0319	
60	8·93	·29	·37	73	·0467	
80	·04	·30	·52	59	·0599	
100	7·84	·27	·53	59	·0717	
200	·35	·24	·58	55	·1287	
[300]	5·64	·08	·68	47	·1797	
[355]				37	·2028	31·7793
[365]				35	·2063	41·8055
400	2·86	34·92	·85	29		

SSE. 2. 61°14′N 2°40′W 17.6.39
850 m. 1520-1600

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·44	35·33	27·15	93		
10	·10	·32	·20	88	·0090	
20	9·77	·32	·26	83	·0176	
30	·71	·32	·27	82	·0258	
40	·48	·32	·31	78	·0338	
60	·66	·32	·28	82	·0498	
80	·40	·33	·33	77	·0657	
100	8·01	·30	·52	60	·0794	
200	7·48	·30	·61	53	·1359	
[300]	6·75	·15	·60	55	·1899	
[365]				35	·2191	44·4825
400	2·78	34·97	·91	24	·2294	
[500]	1·08	·91	·99	15	·2489	76·0700

S. 1-2. 61°08′N 2°10′W 17.6.39
520 m. 1230-1330

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·39	35·38	27·20	88		
10	·24	·40	·24	84	·0086	
20	·15	·40	·25	84	·0170	
30	·06	·40	·27	82	·0253	
40	9·96	·41	·30	79	·0333	
60	10·30	·41	·24	86	·0498	
80	·12	·42	·28	82	·0666	
100	·24	·42	·25	86	·0834	
200	9·00	·41	·46	67	·1599	
[300]	8·83	·41	·48	68	·2274	
[335]				66	·2508	44·0690
400	8·30	·41	·57	61	·2919	
500	7·44	·26	·59	60	·3524	93·8805

S/E. 3-4. 61°01′N 1°36′W 17.6.39
154 m. 0930-1030

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·65	35·43	27·19	89		
10	·65	·42	·18	90	·0090	
20	·62	·42	·19	90	·0180	
30	·61	·42	·19	90	·0270	
40	·59	·42	·19	90	·0360	
60	·45	·41	·21	89	·0539	
80	9·99	·43	·31	80	·0708	
100	·42	·43	·40	71	·0859	
[135]	·15	·41	·43	69	·1104	7·8682
150	·09	·40	·44	68	·1207	
[200]				67	·1545	
[300]				66	·2210	
[335]				66	·2441	43·3922

SSE. 3. 60°56′N 1°00′W 17.6.39
119 m. 0505-0600

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·46	35·38	27·19	89		
10	·46	·37	·18	90	·0090	
20	·46	·34	·16	92	·0181	
30	·46	·41	·21	88	·0271	
40	·20	·41	·26	83	·0357	
60	9·02	·39	·44	67	·0507	
80	8·80	·40	·48	63	·0637	
[100]	·78	·39	·48	64	·0764	
115	·76	·39	·48	64		
[135]				66	·0992	7·2025

VOLUME TRANSPORT

		Km³/hr.
62°00′N 6°12′W.	$\Delta Q=\cdot1323\times185-12{\cdot}4735=12{\cdot}0020$	+0·62
61°54′N 5°45′W.	$\Delta Q=\cdot1146\times185-11{\cdot}4212=9{\cdot}7798$	
”	$\Delta Q=\cdot1309\times215-15{\cdot}1058=13{\cdot}0377$	−0·06
61°49′N 5°21′W.	$\Delta Q=\cdot1316\times215-15{\cdot}0425=13{\cdot}2515$	
61°42′N 4°51′W.	$\Delta Q=\cdot1524\times215-17{\cdot}0217=15{\cdot}7443$	−0·70
”	$\Delta Q=\cdot2316\times360-45{\cdot}0675=38{\cdot}3085$	+0·21
61°35′N 4°15′W.	$\Delta Q=\cdot2309\times360-45{\cdot}5560=37{\cdot}5680$	
”	$\Delta Q=\cdot2330\times375-48{\cdot}8890=38{\cdot}4860$	+1·17
61°28′N 3°42′W.	$\Delta Q=\cdot2059\times375-42{\cdot}9055=34{\cdot}3070$	
”	$\Delta Q=\cdot1999\times355-38{\cdot}9185=32{\cdot}0460$	−0·05
61°21′N 3°10′W.	$\Delta Q=\cdot2028\times355-39{\cdot}7793=32{\cdot}2147$	
”	$\Delta Q=\cdot2063\times365-41{\cdot}8055=33{\cdot}4940$	−0·56
61°14′N 2°40′W.	$\Delta Q=\cdot2191\times365-44{\cdot}4825=35{\cdot}4890$	
”	$\Delta Q=\cdot2489\times500-76{\cdot}0700=48{\cdot}3800$	−9·57
61°08′N 2°10′W.	$\Delta Q=\cdot3524\times500-93{\cdot}8805=82{\cdot}3195$	
”	$\Delta Q=\cdot2508\times335-44{\cdot}0690=39{\cdot}9490$	+0·44
61°01′N 1°36′W.	$\Delta Q=\cdot2441\times335-43{\cdot}3922=38{\cdot}3813$	
“	$\Delta Q=\cdot1104\times135-7{\cdot}8682=7{\cdot}0358$	+0·24
60°56′N 1°00′W.	$\Delta Q=\cdot0992\times135-7{\cdot}2025=6{\cdot}1895$	
		−8·26

FAROE BANK—BUTT OF LEWIS
F.R.S. *EXPLORER*
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ENE. 2. 60°54′N 8°16′W 26.6.39
128 m. 0020-0120

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	9·70	35·32	27·27	81		
10	·70	·31	·26	83	·0082	
20	·71	·33	·27	82	·0164	
30	·71	·34	·28	81	·0246	
40	·74	·32	·26	83	·0328	
60	·73	·33	·27	83	·0494	
80	·72	·32	·27	83	·0660	
100	·72	·33	·27	84	·0827	
120	·72	·32	·27	84		
[200]				77	·1632	
[300]				70	·2367	
[400]				71	·3072	
[500]				52	·3687	
[550]				9	·3839	116·2140

NE. 2. 60°35′N 8°00′W 26.6.39
870 m. 0640-0730

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·22	35·34	27·20	88		
10	·28	·35	·19	89	·0088	
20	·30	·34	·18	90	·0178	
30	·30	·36	·20	89	·0268	
40	·22	·35	·20	89	·0357	
60	·21	·39	·24	86	·0532	
80	·14	·40	·26	84	·0702	
100	·04	·39	·27	84	·0870	
200	9·06	·40	·44	69	·1635	
[300]	8·99	·38	·44	71	·2335	
400	·88	·36	·44	73	·3055	
[500]	·06	·33	·54	65	·3745	
[550]	4·25	·29	28·01	17	·3950	116·9700

E. 3-4. 60°12′N 7°40′W 26.6.39
930 m. 1045-1130

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·72	35·41	27·16	92		
10	·72	·40	·15	93	·0092	
20	·72	·40	·15	93	·0185	
30	·48	·40	·20	89	·0276	
40	·32	·42	·24	85	·0363	
60	·00	·42	·30	80	·0528	
80	9·80	·43	·34	77	·0685	
100	·41	·43	·40	71	·0833	
200	·16	·42	·44	69	·1533	
[300]	8·98	·42	·47	69	·2223	
400	·82	·41	·49	69	·2913	
[500]	3·53	·31	28·10	7	·3293	
[550]	1·82	·09	·08	7	·3328	108·2290

NE. 1. 59°56′N 7°27′W 26.6.39
600 m. 1410-1450

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·35	35·44	27·07	100		
10	·10	·45	·12	96	·0098	
20	·00	·42	·12	96	·0194	
30	10·82	·44	·17	92	·0288	
40	11·26	·44	·06	102	·0385	
60	·14	·44	·11	98	·0585	
80	10·50	·42	·21	89	·0772	
100	·86	·44	·16	94	·0955	
200	9·53	·42	·37	76	·1805	
[300]	·25	·38	·39	76	·2565	
400	·09	·37	·41	76	·3325	
[500]	8·96	·37	·43	76	·4085	
[550]	·86	·38	·46	75	·4463	128·3165

SSE. 1. 59°44′N 7°15′W 26.6.39
1124 m. 1620-1735

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·40	35·43	27·05	102		
10	·24	·45	·10	98	·0100	
20	·12	·44	·11	97	·0198	
30	·10	·41	·09	99	·0296	
40	·00	·46	·15	94	·0392	
60	10·99	·44	·14	95	·0581	
80	·83	·39	·13	97	·0773	
100	·96	·43	·14	96	·0966	
200	9·45	·40	·38	75	·1821	
[300]	·20	·40	·42	73	·2561	
400	·08	·40	·44	73	·3291	
[500]	·03	·40	·45	75	·4031	
[550]	·01	·39	·44	77	·4411	127·6760

Var. 0-1. 59°31′N 7°05′W 26.6.39
1020 m. 1930-2045

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·68	35·44	27·01	106		
10	·40	·44	·06	102	·0104	
20	·30	·44	·08	100	·0205	
30	·30	·41	·06	102	·0306	
40	·27	·38	·04	104	·0409	
60	·03	·42	·12	97	·0610	
80	10·30	·41	·24	86	·0793	
100	9·70	·41	·34	77	·0956	
200	·35	·41	·40	73	·1706	
[300]	·16	·38	·41	74	·2441	
400	·00	·33	·39	78	·3201	
[500]	8·92	·36	·43	76	·3971	
[550]	·90	·37	·44	76	·4351	123.9105

ESE. 1. 59°17′N 6°53′W 26.6.39
489 m. 2220-2315

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·60	35·40	26·99	108		
10	·55	·40	27·00	107	·0108	
20	·35	·40	·04	104	·0214	
30	·30	·40	·05	103	·0318	
40	·30	·41	·05	103	·0421	
60	·28	·40	·04	105	·0629	
80	·11	·45	·14	96	·0830	
100	10·47	·46	·25	86	·1012	
200	9·95	·46	·34	79	·1837	
[300]	·77	·45	·36	80	·2632	
[315]				80	·2752	45·8295
[400]	·66	·42	·36	82	·3442	
450	·62	·41	·35	84	·3857	
[500]				83	·4275	
[550]				81	·4685	133·1390

ESE. 1. 59°00′N 6°40′W 27.6.39
135 m. 0230-0330

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·91	35·27	27·02	105		
10	·90	·27	·02	105	·0105	
20	·74	·29	·06	102	·0209	
30	·73	·28	·06	102	·0311	
40	·69	·29	·07	101	·0413	
60	·34	·31	·15	94	·0608	
80	9·75	·37	·30	80	·0782	
100	·60	·38	·33	78	·0940	
[125]				77	·1134	7·5570
130	·51	·38	·35	77		
[200]				80	·1730	
[300]				80	·2530	
[315]				80	·2650	43·4995

S. 1. 58°40′N 6°10′W 27.6.39
110 m. 0930-1015

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·50	35·08	26·76	130		
10	·35	·17	·86	121	·0126	
20	·11	·25	·97	110	·0242	
30	10·55	·27	27·08	100	·0347	
40	·42	·23	·07	101	·0447	
60	·16	·28	·16	93	·0641	
80	9·74	·30	·25	85	·0819	
105	·72	·30	·25	86	·1033	
[125]				80	·1199	8·0335

VOLUME TRANSPORT

		Km³/hr
60°54′N 8°16′W.	ΔQ=·3839×550−116·2140= 94·9310	
		− 1·51
60°35′N 8°00′W.	ΔQ=·3950×550−116·9700=100·2800	
		+ 7·23
60°12′N 7°40′W.	ΔQ=·3328×550−108·2290= 74·8110	
		−12·06
59°56′N 7°27′W.	ΔQ=·4463×550−128·3165=117·1485	
		+ 0·63
59°44′N 7°15′W.	ΔQ=·4411×550−127·6760=114·9290	
		− 0·13
59°31′N 7°05′W.	ΔQ=·4351×550−123·9105=115·3945	
		− 2·62
59°17′N 6°53′W.	ΔQ=·4685×550−133·1390=124·5360	
”	ΔQ=·2752×315− 45·8295= 40·8585	
		+ 0·25
59°00′N 6°40′W.	ΔQ=·2650×315− 43·4995= 39·9755	
”	ΔQ=·1134×125− 7·5570= 7·7520	
		− 0·12
58°40′N 6°10′W.	ΔQ=·1199×125− 8·0335= 8·1530	
		− 8·33

NOLSØ, FAROE—FLUGGA, SHETLAND

Danish Research Vessel *DANA*

13-14 July, 1939

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
			62°00′N 6°12′W			14.7.39
			110 m.			2010-2047
0	9·99	35·33	27·23	85		
10	·79	·32	·26	83	·0084	
25	·48	·28	·28	81	·0207	
50	·04	·26	·33	77	·0405	
75	·00	·27	·35	75	·0595	
100	8·99	·25	·34	77	·0785	
[145]				67	·1109	8·2617
			61°49′N 5°21′W			14·7·39
			180 m.			1616-1650
0	10·23	35·30	27·16	92		
10	9·97	·30	·21	87	·0090	
25	·79	·30	·24	85	·0219	
50	·56	·31	·29	81	·0427	
75	8·93	·32	·40	71	·0617	
100	·57	·30	·44	67	·0789	
[145]				62	·1079	8·3498
150	·10	·28	·50	62		
175	·09	·28	·50	63		
[195]				63	·1407	14·5778
			61°42′N 4°51′W			14.7.39
			205 m.			1410-1442
0	10·53	35·33	27·13	95		
10	·35	·34	·17	91	·0093	
25	9·77	·34	·27	82	·0223	
50	8·90	·31	·40	70	·0413	
75	·51	·32	·46	65	·0582	
100	·35	·32	·49	63	·0742	
150	·19	·30	·50	62	·1054	
[195]				62	·1336	13·8478
200	·17	·31	·51	62	·1364	
[300]				60	·1974	
[400]				45	·2499	
[410]				44	·2543	56·0883

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
			61°35′N 4°15′W			14.7.39
			1070 m.			1148-1227
0	10·37	35·25	27·10	98		
10	·35	·27	·12	96	·0097	
25	·22	·26	·13	95	·0240	
50	9·17	·32	·36	74	·0451	
75	8·51	·34	·48	63	·0622	
100	·29	·34	·51	61	·0777	
150	·11	·34	·54	59	·1077	
200	7·87	·30	·55	59	·1372	
300	6·96	·26	·67	48	·1907	
[385]				33	·2251	49·0791
400	3·86	·03	·85	30	·2297	
[410]				28	·2326	54·7391
500	1·56	34·95	28·00	14		
			61°21′N 3°10′W			14.7.39
			1230 m.			0720-0806
0	10·68	35·34	27·11	97		
10	·68	·36	·13	95	·0096	
25	·35	·31	·15	93	·0237	
50	8·99	·27	·35	75	·0447	
75	7·99	·28	·51	60	·0616	
100	·79	·29	·56	56	·0761	
150	·45	·27	·60	53	·1033	
200	6·77	·26	·68	46	·1281	
300	4·06	·03	·82	32	·1671	
[385]				20	·1892	44·3756
400	1·70	34·92	·96	18	·1921	
500	0·35	·94	28·06	7	·2046	
[515]				7	·2056	70·1043
600	–0·19	·93	·08	4		
			61°08′N 2°10′W			14.7.39
			505 m.			0253-0324
0	11·29	35·41	27·06	101		
10	·28	·43	·08	100	·0100	
25	·09	·42	·10	98	·0248	
50	10·78	·41	·15	94	·0488	
75	9·93	·43	·32	78	·0703	
100	·81	·44	·34	77	·0897	
150	·62	·44	·38	74	·1275	
200	·49	·44	·40	73	·1643	
300	·46	·42	·39	76	·2388	
[320]				75	·2539	42·5268
400	8·92	·39	·45	72	·3128	
500	7·21	·26	·62	57	·3773	
[515]				54	·3856	105·4066
			61°01′N 1°36′W			13/14.7.39
			136 m.			2332-0005
0	11·31	35·42	27·06	101		
10	·39	·41	·04	103	·0102	
25	·02	·41	·11	97	·0252	
50	·00	·41	·11	98	·0496	
75	10·02	·43	·30	80	·0718	
100	9·55	·43	·38	73	·0909	
[125]				66	·1083	7·2928
130	·05	·43	·47	65	·1116	
[200]				65	·1599	
[300]				70	·2274	
[320]				71	·2415	41·3968
			60°53′N 1°06′W			13.7.39
			110 m.			2132-2149
0	11·12	35·23	26·95	112		
10	10·77	·29	27·06	102	·0107	
25	·26	·29	·15	93	·0351	
50	9·60	·29	·26	83	·0571	
75	·20	·28	·32	78	·0772	
100	8·87	·29	·38	73	·0961	
[125]				68	·1137	8·0170

VOLUME TRANSPORT

		Km³/hr
62°00′N 6°12′W.	ΔQ=·1109×145− 8·2617= 7·8188	+ 0·15
61°49′N 5°21′W.	ΔQ=·1079×145− 8·3498= 7·2957	
”	ΔQ=·1407×195− 14·5778=12·8587	+ 0·18
61°42′N 4°51′W.	ΔQ=·1336×195− 13·8478=12·2042	
”	ΔQ=·2543×410− 56·0883=48·1747	+ 2·12
61°35′N 4°15′W.	ΔQ=·2326×410− 54·7391=40·6269	
”	ΔQ=·2251×385− 49·0791=37·5844	+ 2·56
61°21′N 3°10′W.	ΔQ=·1892×385− 44·3756=28·4664	
”	ΔQ=·2056×515− 70·1043=35·7795	−16·17
61°08′N 2°10′W.	ΔQ=·3856×515−105·4066=93·1774	
”	ΔQ=·2539×320− 42·5268=38·7212	+ 0·80
61°01′N 1°36′W.	ΔQ=·2415×320− 41·3968=35·8832	
”	ΔQ=·1083×125− 7·2928= 6·2447	+ 0·01
60°53′N 1°06′W.	ΔQ=·1137×125− 8·0170= 6·1955	
		−10·35

1946

NOLSØ, FAROE-FLUGGA, SHETLAND

Danish Research Vessel, *DANA*

26-27 August, 1946

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
			61°51N 5°21′W			27.8.46
			168 m.			0903-0952
0	11·86	35·18	26·78	128		
10	·73	·22	·83	123	·0126	
25	·41	·23	·90	117	·0306	
50	9·90	·24	27·18	91	·0566	
75	8·52	·26	·42	69	·0766	
100	·38	·26	·44	67	·0936	
150	·46	·25	·42	70	·1279	
165	·46	·26	·43	69		
[180]				68	·1486	16·6295
			61°46′N 4°46½′W			27.8.46
			195 m.			0707-0747
0	12·12	35·25	26·78	128		
10	·02	·21	·77	129	·0129	
25	11·48	·24	·89	118	·0314	
50	10·14	·29	27·17	92	·0577	
75	9·29	·28	·31	79	·0791	
100	8·81	·29	·39	72	·0980	
150	·40	·28	·45	67	·1328	
[180]				67	·1529	15·4921
190	·37	·28	·46	67		
[200]				67	·1663	
[290]				61	·2239	36·2431
			61°32½′N 4°15′W			27.8.46
			750 m.			0122-0245
0	12·79	35·12	26·55	150		
10	·80	·14	·56	149	·0150	
25	·06	·17	·73	133	·0362	
50	9·30	·29	27·31	79	·0627	
75	8·51	·27	·43	68	·0811	
100	·23	·26	·46	65	·0977	
150	·05	·26	·49	63	·1297	
200	7·68	·23	·52	61	·1607	
[290]				48	·2098	35·3473
300	5·24	·03	·69	46	·2142	
[350]				33	·2340	48·6723
400	1·74	34·92	·95	19		
			61°25½·N 3°43′W			26.8.46
			1100 m.			2105-2251
0	12·30	35·18	26·69	136		
10	·13	·18	·72	134	·0135	
25	11·80	·20	·80	127	·0331	
50	9·99	·25	27·17	92	·0605	
75	8·81	·26	·36	74	·0813	
100	·55	·26	·41	70	·0993	
150	·21	·26	·46	66	·1333	
200	7·95	·23	·48	65	·1661	
300	·00	·16	·56	59	·2281	
[350]				50	·2554	50·7145
[355]				49	·2579	51·9978
400	4·01	34·93	·75	40		
			61°19′N 3°11′W			26.8.46
			1150 m.			1611-1849
0	12·92	35·08	26·49	155		
10	·83	·12	·54	151	·0153	
25	·65	·15	·60	146	·0376	
50	9·83	·21	27·17	92	·0674	
75	8·76	·24	·37	73	·0880	
100	·30	·26	·45	66	·1054	
150	7·92	·26	·51	61	·1372	
200	·59	·21	·52	61	·1677	
300	5·98	·07	·63	52	·2242	
[340]				42	·2430	48·7723
[355]				38	·2490	52·4623
400	2·41	34·88	·86	28		
			61°13′N 2°40′W			26.8.46
			1020 m.			1122-1348
0	12·50	35·06	26·55	150		
10	·30	·08	·61	144	·0147	
25	11·41	·12	·81	126	·0350	
50	9·40	·21	27·23	86	·0615	
75	8·70	·25	·38	72	·0813	
100	·44	·26	·43	68	·0988	
150	·15	·23	·45	67	·1326	
200	7·70	·21	·50	63	·1651	
300	6·12	·07	·61	54	·2236	
[340]				43	·2430	47·6334
400	2·63	34·91	·87	27	·2641	
[410]				26	·2668	65·5009
500	0·52	·91	28·02	11		
			61°07′N 2°11′W			26.8.46
			460 m.			0752-0925
0	11·90	35·16	26·75	131		
10	·69	·23	·84	122	·0127	
25	·33	·27	·95	112	·0303	
50	10·62	·26	27·07	102	·0571	
75	9·78	·26	·21	89	·0810	
100	·52	·26	·26	84	·1026	
150	8·75	·27	·39	73	·1419	
200	·64	·27	·41	72	·1782	
300	7·88	·26	·52	63	·2457	
[305]					·2489	42·0463
400	·10	·18	·57	60	·3072	
[410]					·3131	71·5626
450	5·54	·04	·66	51		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
			61°00′N 1°37′W			26.8.46
			150 m.			0330-0407
0	12·89	35·16	26·56	149		
10	·58	·33	·75	131	·0140	
25	·41	·32	·77	129	·0335	
50	10·94	·38	27·10	99	·0620	
75	·31	·39	·22	88	·0854	
100	9·92	·41	·31	80	·1064	
[130]				81	·1306	13·6551
140	·87	·39	·30	82		
[150]				82	·1469	
[200]				78	·1869	
[300]				66	·2589	
[305]				66	·2622	48·3679
			60°53′N 1°05′W			26.8.46
			108 m.			0048-0116
0	12·97	35·21	26·58	147		
10	·89	·22	·60	145	·0146	
25	11·85	·16	·76	130	·0352	
50	·18	·19	·91	117	·0661	
75	10·44	·22	27·07	102	·0935	
95	·33	·21	·08	102	·1139	
[100]				102	·1190	
[130]				90	·1478	10·3661

VOLUME TRANSPORT

		Km³/hr.
61°51′N 5°21′W.	ΔQ=·1486 × 180−16·6295=10·1185	−0·54
61°46′N 4°46½′W.	ΔQ=·1529 × 180−15·4921=12·0299	
”	ΔQ=·2239 × 290−36·2431=28·6879	+0·90
61°32½N 4°15′W.	ΔQ=·2098 × 290−35·3473=25·4947	
”	ΔQ=·2340 × 350−48·6723=33·2277	−1·53
61°25½N 3°43′W.	ΔQ=·2554 × 350−50·7145=38·6755	
”	ΔQ=·2579 × 355−51·9978=39·5567	+1·02
61°19′N 3°11′W.	ΔQ=·2490 × 355−52·4623=35·9327	
”	ΔQ=·2430 × 340−48·7723=33·8477	−0·32
61°13′N 2°40′W.	ΔQ=·2430 × 340−47·6334=34·9866	
”	ΔQ=·2668 × 410−65·5009=43·8871	−3·64
61°07′N 2°11′W.	ΔQ=·3131 × 410−71·5626=56·8084	
”	ΔQ=·2489 × 305−42·0463=33·8682	+0·64
61°00′N 1°37′W.	ΔQ=·2622 × 305−48·3679=31·6031	
”	ΔQ=·1306 × 130−13·6551= 3·3229	−1·56
60°53′N 1°05′W.	ΔQ=·1478 × 130−10·3661= 8·8479	
		−5·03

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NOLSØ, FAROE—FLUGGA, SHETLAND

F.R.S. *EXPLORER*

10-12 June, 1947

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SE. 3.			62°00′N 6°12′W			12.6.47
			110 m.			0130-0235
0	8·51	35·23	27·39	70		
10	·47	·21	·38	71	·0070	
20	·43	·21	·39	70	·0140	
30	·16	·21	·43	67	·0208	
40	·03	·19	·43	67	·0275	
60	·01	·19	·44	66	·0408	
80	·01	·19	·44	67	·0541	
[100]				66	·0674	
105	·02	·21	·45	66		
[180]				51	·1142	10·6665

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SE. 2-3.			61°54′N 5°45′W			11.6.47
			255 m.			2045-2210
0	9·22	35·23	27·28	80		
10	·01	·23	·31	78	·0079	
20	·01	·25	·33	76	·0156	
30	8·82	·26	·37	73	·0230	
40	·74	·26	·38	72	·0302	
60	·49	·28	·44	66	·0440	
80	7·68	·28	·56	55	·0561	
100	·49	·30	·61	51	·0667	
[180]				52	·1079	10·5710
200	6·91	·21	·62	52	·1182	
[210]				52	·1234	14·0400
250	·75	·21	·64	50		
SE. 2.			61°49′N 5°21′W			11.6.47
			160 m.			1800-1910
0	9·14	35·25	27·31	78		
10	·14	·27	·32	77	·0078	
20	8·93	·28	·37	72	·0152	
30	·91	·30	·39	71	·0224	
40	·87	·28	·38	72	·0296	
60	·32	·28	·47	64	·0432	
80	7·87	·30	·55	56	·0552	
100	·66	·28	·57	55	·0663	
155	·33	·28	·61	52	·0957	
[205]				51	·1215	13·4140
[210]				52	·1243	14·0340
SE. 2.			61°42′N 4°51′W			11.6.47
			247 m.			1510-1630
0	9·90	35·32	27·24	84		
10	·88	·30	·22	86	·0085	
20	·56	·30	·28	81	·0169	
30	·33	·30	·32	77	·0248	
40	·18	·30	·34	76	·0234	
60	8·65	·30	·43	67	·0467	
80	·16	·30	·51	60	·0594	
100	·08	·30	·52	60	·0714	
[200]	7·34	·26	·59	55	·1289	
[205]				54	·1316	14·4902
225	·06	·25	·63	51		
[300]				43	·1779	
[310]				41	·1821	30·9790
SE. 2.			61°35′N 4°15′W			11.6.47
			610 m.			1130-1320
0	10·69	35·35	27·12	96		
10	·27	·34	·19	89	·0092	
20	9·90	·34	·25	84	·0178	
30	·86	·32	·25	84	·0262	
40	·85	·34	·26	83	·0346	
60	·37	·34	·34	76	·0505	
80	8·34	·39	·55	57	·0638	
100	·24	·33	·52	59	·0754	
200	7·53	·33	·62	52	·1309	
[300]	5·22	·09	·74	40	·1769	
[310]				39	·1809	31·5850
400	2·89	34·88	·82	32	·2129	
[500]	0·85	·91	28·00	13	·2354	
[565]				6	·2416	87·2035
600	−0·45	·94	·10	2		

Var. 2. 61°28′N 3°42′W 11.6.47
1250 m. 0730-0930

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·10	35·31	27·19	89		
10	9·81	·30	·24	84	·0086	
20	·49	·30	·29	80	·0168	
30	·31	·32	·34	75	·0246	
40	·12	·30	·35	75	·0321	
60	8·61	·30	·43	67	·0463	
80	·20	·32	·51	60	·0590	
100	·19	·30	·50	62	·0712	
200	·07	·30	·52	61	·1327	
[300]	7·26	·21	·57	58	·1922	
400	5·86	·14	·70	46	·2442	
[500]	4·30	·11	·86	31	·2827	
[565]				23	·3003	97·3520
[575]				21	·3022	100·3383
600	2·73	·08	·99	18		
800	–0·42	34·96	28·11	1		

Var. 2. 61°21′N 3°10′W 11.6.47
1280 m. 0210-0500

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·40	35·30	27·13	95		
10	·23	·30	·16	92	·0094	
20	9·95	·30	·21	88	·0184	
30	·94	·33	·24	85	·0270	
40	·87	·32	·24	85	·0355	
60	·84	·34	·26	84	·0524	
80	·44	·35	·34	77	·0685	
100	·06	·37	·42	69	·0831	
200	7·99	·27	·51	62	·1486	
[300]	·19	·23	·59	56	·2076	
400	5·99	·15	·69	47	·2591	
[500]	2·05	34·99	·98	17	·2911	
[560]				14	·3004	102·3145
[575]				13	·3023	106·8220
600	0·69	·90	28·01	12		
800	–0·34	·90	·06	6		

Var. 1. 61°14′N 2°40′W 10.6.47
1080 m. 2210-2400

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	12·24	35·27	26·77	129		
10	10·62	·28	27·08	100	·0114	
20	·32	·28	·13	95	·0212	
30	·25	·28	·15	94	·0306	
40	·18	·31	·18	91	·0398	
60	9·99	·34	·24	86	·0575	
80	·41	·38	·37	74	·0735	
100	·31	·38	·38	73	·0882	
200	·53	·37	·34	79	·1642	
[300]	·45	·35	·34	81	·2442	
400	·08	·29	·35	82	·3257	
[500]	5·88	·15	·71	47	·3902	
[560]				31	·4136	126·1750
600	2·40	·00	·96	20	·4237	
[635]				18	·4303	157·7010
800	–0·31	34·88	28·04	8		

Var. 1-2. 61°08 N 2°10′W 10.6.47
615 m. 1845-2020

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·78	35·34	27·10	98		
10	·33	·34	·18	90	·0094	
20	·13	·34	·21	88	·0183	
30	·12	·34	·21	88	·0271	
40	·09	·33	·21	88	·0359	
60	9·85	·35	·27	83	·0530	
80	·67	·36	·31	79	·0692	
100	·60	·42	·37	74	·0845	
200	·45	·41	·38	75	·1590	
[300]	·25	·42	·43	73	·2330	
[390]				72	·2982	60·0545
400	·06	·42	·46	72	·3055	
[500]	8·07	·28	·50	69	·3760	
600	5·24	·09	·74	45	·4330	
[635]				36	·4472	153·0040

N. 2. 61°01′N 1°36′W 10.6.47
165 m. 1745-1830

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·68	35·27	27·06	101		
10	·41	·26	·10	98	·0100	
20	·01	·28	·19	89	·0194	
30	·00	·27	·18	91	·0284	
40	9·99	·28	·19	90	·0374	
60	·79	·32	·26	84	·0548	
80	·21	·35	·37	74	·0706	
100	·06	·35	·40	71	·0851	
[135]				69	·1096	7·9052
160	8·75	·35	·45	68		
[200]				70	·1556	
[300]				73	·2271	
[390]				72	·2923	59·0410

N. 2. 60°56′N 1°00′W 10.6.47
110 m. 1110-1210

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·27	35·23	27·27	81		
10	·21	·26	·31	78	·0080	
20	·03	·28	·35	74	·0156	
30	·01	·30	·37	73	·0230	
40	8·57	·32	·45	65	·0299	
60	7·61	·22	·52	59	·0423	
80	·61	·21	·52	59	·0541	
105	·60	·19	·50	61	·0691	
[135]				64	·0879	5·8885

VOLUME TRANSPORT

		Km³/hr
62°00′N 6°12′W.	ΔQ = ·1142 × 180 − 10·6665 = 9·8895	+ 0·29
61°54′N 5°45′W.	ΔQ = ·1079 × 180 − 10·5710 = 8·8510	
”	ΔQ = ·1234 × 210 − 14·0400 = 11·8740	− 0·05
61°49′N 5°21′W.	ΔQ = ·1243 × 210 − 14·0340 = 12.0690	
”	ΔQ = ·1215 × 205 − 13·4140 = 11·4935	− 0·28
61°42′N 4°51′W.	ΔQ = ·1316 × 205 − 14·4902 = 12·4878	
”	ΔQ = ·1821 × 310 − 30·9790 = 25·4720	+ 0·27
61°35′N 4°15′W.	ΔQ = ·1809 × 310 − 31·5850 = 24·4940	
”	ΔQ = ·2416 × 565 − 87·2035 = 49·3005	− 6·46
61°28′N 3°42′W.	ΔQ = ·3003 × 565 − 97·3520 = 72·3175	
”	ΔQ = ·3022 × 575 − 100·3383 = 73·4267	+ 1·81
61°21′N 3°10′W.	ΔQ = ·3023 × 575 − 106·8220 = 67·0005	
”	ΔQ = ·3004 × 560 − 102·3145 = 65·9095	−11·13
61°14′N 2°40′W.	ΔQ = ·4136 × 560 − 126·1750 = 105·4410	
”	ΔQ = ·4303 × 635 − 157·7010 = 115·5395	− 4·35
61°08′N 2°10′W.	ΔQ = ·4472 × 635 − 153·0040 = 130·9680	
”	ΔQ = ·2982 × 390 − 60·0545 = 56·2435	+ 0·36
61°01′N 1°36′W.	ΔQ = ·2923 × 390 − 59·0410 = 54·9560	
”	ΔQ = ·1096 × 135 − 7·9052 = 6·8908	+ 0·26
60°56′N 1°00′W.	ΔQ = ·0879 × 135 − 5·8885 = 5·9780	
		−19·28

FAROE BANK—BUTT OF LEWIS
F.R.S. *EXPLORER*
18-19 June, 1947

SSW. 3. 60°54′N 8°16′W 18.6.47
123 m. 0940-1040

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	9·82	35·30	27·24	84		
10	·79	·28	·23	85	·0085	
20	·61	·30	·27	82	·0169	
30	·23	·30	·34	75	·0248	
40	·14	·30	·35	75	·0398	
60	·02	·30	·37	73	·0546	
80	·02	·30	·37	74	·0693	
[100]				72	·0839	
115	·02	·30	·37	71		
[200]				65	·1524	
[300]				49	·2094	
[400]				20	·2439	
[500]				15	·2614	
[550]				14	·2686	95·5010

S. 3. 60°35′N 8°00′W 18.6.47
900 m. 1500-1730

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·58	35·34	27·14	94		
10	·54	·32	·13	95	·0095	
20	·48	·34	·16	92	·0189	
30	·40	·34	·17	92	·0281	
40	·30	·34	·19	90	·0372	
60	9·63	·34	·30	80	·0542	
80	·36	·34	·35	76	·0698	
100	·19	·34	·38	73	·0847	
200	8·60	·34	·47	66	·1542	
300	7·20	·25	·60	55	·2147	
400	4·05	·17	·94	22	·2477	
500	2·43	·06	28·01	15	·2662	
[550]	·03	·01	·01	14	·2734	97·0450
[600]	1·74	34·99	·01	14		

S. 2. 60°12′N 7°40′W 18.6.47
624 m. 2100-2230

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·63	35·34	27·13	95		
10	·63	·34	·13	95	·0095	
20	·48	·34	·15	93	·0189	
30	·22	·34	·20	89	·0280	
40	·00	·33	·23	86	·0368	
60	9·50	·33	·31	79	·0533	
80	·21	·34	·37	74	·0686	
100	·12	·33	·37	74	·0834	
200	·10	·33	·38	75	·1579	
[300]	8·98	·32	·39	76	·2334	
400	·71	·32	·43	74	·3084	
[500]	·23	·31	·50	69	·3799	
[550]	7·96	·30	·55	65	·4134	117·3555
600	·67	·30	·58	63		

S. 2. 59°56′N 7°27′W 19.6.47
730 m. 1225-1410

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·79	35·33	27·09	98		
10	·79	·39	·14	94	·0096	
20	·70	·35	·12	96	·0191	
30	·70	·35	·12	96	·0287	
40	·60	·35	·14	95	·0383	
60	9·50	·36	·34	76	·0554	
80	·22	·36	·39	72	·0702	
100	8·95	·34	·41	70	·0844	
200	9·48	·35	·33	80	·1594	
300	8·86	·35	·43	72	·2354	
[400]	·86	·35	·43	74	·3084	
500	·85	·36	·45	75	·3829	
[550]	·83	·36	·45	75	·4204	118·2720
700	·66	·33	·45	78		

S. 2. 59°44′N 7°15′W 19.6.47
1032 m. 0345-0530

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·85	35·35	27·09	98		
10	·85	·35	·09	99	·0098	
20	·78	·35	·11	97	·0196	
30	·65	·35	·13	95	·0292	
40	·31	·35	·19	90	·0384	
60	9·90	·35	·26	84	·0558	
80	·66	·35	·30	80	·0722	
100	·64	·35	·31	80	·0882	
200	·05	·39	·43	70	·1632	
[300]	8·86	·36	·44	71	·2337	
400	·79	·33	·43	74	·3062	
[500]	·74	·33	·43	76	·3812	
[550]	·71	·32	·43	77	·4194	118·3990
600	·68	·32	·44	77		

S/W. 2. 59°31′N 7°05′W 19·6·47
1026 m. 0720-0915

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·98	35·34	27·06	101		
10	·92	·37	·10	98	·0100	
20	·88	·35	·09	99	·0198	
30	·77	·35	·11	97	·0296	
40	·14	·35	·13	96	·0392	
60	9·60	·37	·33	77	·0565	
80	·38	·37	·37	74	·0716	
100	·60	·37	·33	78	·0868	
200	·08	·38	·42	71	·1613	
[300]	8·97	·36	·42	73	·2333	
400	·85	·35	·44	73	·3063	
[500]	·81	·34	·43	76	·3808	
[550]	·80	·34	·44	76	·4188	118·0720
600	·79	·34	·44	77		

SSW. 3. 59°17′N 6°53′W 19.6.47
540 m. 1105-1220

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	11·80	35·33	26·90	117		
10	·67	·33	·93	114	·0116	
20	·62	·37	·97	110	·0228	
30	·61	·35	·95	112	·0339	
40	·54	·36	·98	110	·0450	
60	·24	·37	27·04	105	·0665	
80	10·03	·38	·27	83	·0853	
100	9·95	·41	·30	81	·1017	
200	·80	·39	·31	82	·1832	
300	·60	·39	·35	80	·2642	
[340]				80	·2962	53·2240
[400]	·46	·38	·36	81	·3447	
[500]	·32	·36	·37	82	·4262	
530	·27	·36	·38	82		
[550]				82	·4672	133·3510

S. 1. 59°00′N 6°40′W 19.6.47
145 m. 1430-1540

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	12·06	35·16	26·72	134		
10	·06	·15	·71	135	·0134	
20	11·10	·16	·90	117	·0260	
30	10·73	·23	27·02	106	·0372	
40	·11	·25	·15	94	·0472	
60	9·59	·29	·25	85	·0651	
80	·29	·33	·35	75	·0811	
100	·22	·32	·35	76	·0962	
[130]				74	·1187	8·5835
140	·17	·33	·37	74		
[200]				76	·1712	
[300]				80	·2492	
[340]				80	·2812	50·3580

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SSE. 2.			58°40′N 6°10′W			19.6.47
			115 m.			1830-1910
0	11·72	34·81	26·51	154		
10	·31	·86	·63	142	·0148	
20	·01	·87	·69	137	·0288	
30	10·81	·87	·73	133	·0423	
40	·62	·95	·82	125	·0552	
60	8·56	35·07	27·26	84	·0761	
80	·51	·07	·27	83	·0928	
110	·62	·11	·28	82	·1176	
[130]				78	·1336	9·8050

Volume Transport

		Km³/hr.
60°54′N 8°16′W.	ΔQ=·2686×550− 95·5010= 52·2290	
		− 0·31
60°35′N 8°00′W.	ΔQ=·2734×550− 97·0450= 53·3250	
		−16·09
60°12′N 7°40′W.	ΔQ=·4134×550−117·3555=110·0145	
		− 0·84
59°56′N 7°27′W.	ΔQ=·4204×550−118·2720=112·9480	
		+ 0·19
59°44′N 7°15′W.	ΔQ=·4194×550−118·3990=112·2710	
		0·00
59°31′N 7°05′W.	ΔQ=·4188×550−118·0720=112·2680	
		− 3·25
59°17′N 6°53′W.	ΔQ=·4672×550−133·3510=123·6090	
”	ΔQ=·2962×340− 53·2240= 47·4840	
		+ 0·64
59°00′N 6°40′W.	ΔQ=·2812×340− 50·3580= 45·2500	
”	ΔQ=·1187×130− 8·5835= 6·8475	
		− 0·21
58°40′N 6°10′W.	ΔQ=·1336×130− 9·8050= 7·5630	
		−19·87

NOLSØ, FAROE—FLUGGA, SHETLAND

Danish Research Vessel *DANA*

19-20 July, 1947

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
			62°00′N 6°12′W			19.7.47
			105 m.			0059-0114
0	10·39	35·17	27·03	104		
10	·03	·17	·10	98	·0101	
25	9·41	·18	·21	88	·0241	
50	·37	·20	·23	86	·0459	
75	·37	·20	·23	87	·0675	
100	·37	·20	·23	87	·0893	
[150]				70	·1285	
[180]				63	·1485	14·1595
			61°54½′N 5°45′W			19.7.47
			260 m.			0243-0319
0	11·43	35·22	26·88	118		
10	·32	·21	·90	117	·0118	
25	10·69	·25	27·05	103	·0283	
50	9·57	·26	·25	84	·0517	
75	8·52	·28	·43	68	·0707	
100	·24	·28	·48	63	·0871	
150	7·68	·25	·54	59	·1176	
[180]				58	·1352	13·7718
200	·52	·25	·56	57	·1466	
[215]				57	·1552	18·8483
240	·47	·25	·57	57		
			61°49′N 5°21′W			19.7.47
			170 m.			0444-0458
0	11·67	35·23	26·85	121		
10	·57	·22	·86	121	·0121	
25	10·60	·26	27·07	101	·0287	
50	9·59	·26	·24	85	·0519	
75	8·99	·27	·35	75	·0719	
100	7·74	·27	·54	58	·0885	
165	·74	·30	·57	56		
[185]				57	·1361	14·4720
[200]				60	·1449	
[215]				58	·1537	18·8190
			61°42½′N 4°51′W			19.7.47
			200 m.			0738-0802
0	11·99	35·27	26·82	124		
10	·90	·26	·83	123	·0124	
25	·77	·29	·88	119	·0306	
50	8·98	·33	27·40	70	·0542	
75	·46	·32	·48	63	·0708	
100	·27	·33	·51	61	·0863	
150	·11	·33	·54	59	·1163	
[185]				60	·1371	14·4703
190	7·82	·27	·53	60		
[200]				60	·1461	
[300]				48	·2001	
[325]				46	·2119	39·0558
			61°35′N 4°15′W			19.7.47
			1060 m.			1012-1035
0	13·14	35·26	26·58	147		
10	12·47	·25	·71	135	·0141	
25	11·20	·25	·95	112	·0326	
50	8·77	·31	27·42	68	·0551	
75	·50	·31	·46	65	·0717	
100	·26	·35	·53	59	·0872	
150	7·73	·28	·55	58	·1165	
200	·29	·26	·62	52	·1440	
300	6·16	·17	·69	46	·1930	
[325]				42	·2040	38·5056
405	3·16	34·92	·83	31		
			61°29′N 3°41′W			19.7.47
			1110 m.			1232-1255
0	13·99	35·26	26·41	163		
10	·37	·26	·54	151	·0157	
25	11·34	·26	·93	114	·0356	
50	8·28	·22	27·42	68	·0584	
75	7·97	·25	·49	62	·0747	
100	·69	·27	·54	58	·0897	
150	·02	·23	·62	51	·1170	
200	6·54	·19	·65	49	·1420	
300	4·06	34·97	·78	36	·1845	
[315]				34	·1897	36·1311
[325]				32	·1930	38·0434
400	1·99	·94	·94	20		
			61°21′N 3°10′W			19.7.47
			1250 m.			1539-1608
0	14·95	35·21	26·16	187		
10	13·09	·26	·60	145	·0166	
25	10·84	·25	27·02	106	·0354	
50	8·62	·28	·42	68	·0572	
75	·31	·31	·49	62	·0735	
100	7·81	·28	·54	58	·0885	
150	·09	·23	·61	52	·1160	
200	6·53	·20	·65	49	·1413	
300	4·42	·04	·79	35	·1833	
[315]				33	·1884	35·8521
395	2·03	34·95	·95	19	·2092	
[405]				18	·2110	53·8571
495	0·15	·93	28·06	7		

61°14′N 2°40′W 19.7.47
1050 m. 1745-1807

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	14·51	35·30	26·33	171		
10	13·00	·28	·63	142	·0156	
25	11·68	·30	·90	117	·0350	
50	9·59	·29	27·27	83	·0600	
75	·05	·30	·36	74	·0796	
100	8·61	·30	·43	68	·0974	
150	·23	·30	·49	63	·1302	
200	7·88	·26	·52	61	·1612	
300	·24	·25	·60	55	·2192	
400	5·48	·08	·70	46	·2697	
[405]				45	·2720	63·3967
500	1·88	34·95	·96	19	·3022	
600	–0·04	·93	28·07	6	·3147	121·4825
800	–0·74	·90	·08	3		

61°08′N 2°10′W 19.7.47
560 m. 2000-2017

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	13·99	35·33	26·46	158		
10	12·70	·31	·71	135	·0146	
25	11·36	·32	·98	110	·0330	
50	10·04	·34	27·23	86	·0575	
75	9·49	·35	·33	77	·0779	
100	·36	·37	·37	74	·0968	
150	8·75	·34	·44	68	·1323	
200	·48	·33	·48	65	·1656	
295	7·76	·29	·56	59	·2245	
[360]				58	·2625	53·2698
395	·30	·26	·60	57	·2826	
525	5·45	·14	·75	43	·2976	
[600]				35	·3268	94·9270

61°01′N 1°36′W 20.7.47
160 m. 0102-0119

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	13·50	35·37	26·60	145		
10	12·35	·36	·82	124	·0134	
25	11·31	·36	27·02	106	·0307	
50	9·98	·39	·28	82	·0542	
75	·73	·41	·34	77	·0741	
100	·59	·41	·36	75	·0931	
[135]				71	·0957	8·4568
150	8·92	·36	·43	69	·1291	
[200]				68	·1633	
[300]				65	·2298	
[360]				60	·2673	52·5858

60°56′N 1°15′W 20.7.47
110 m. 0228-0241

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	14·90	35·28	26·23	180		
10	·07	·32	·44	160	·0170	
25	12·14	·37	·87	120	·0380	
50	9·61	·34	27·30	80	·0630	
75	·22	·37	·39	72	·0820	
100	8·66	·34	·46	65	·0991	
[135]				67	·1222	9·7091

VOLUME TRANSPORT

		Km³/hr
62°00′N 6°12′W.	ΔQ=·1485×180– 14·1595= 12·5705	+0·56
61°54½′N 5°45′W.	ΔQ=·1352×180– 13·7718= 10·5642	
”	ΔQ=·1552×215– 18·8483= 14·5197	+0·08
61°49′N 5°21′W.	ΔQ=·1537×215– 18·8190= 14·2265	
”	ΔQ=·1361×185– 14·4720= 10·9065	+0·00
61°42½′N 4°51′W.	ΔQ=·1371×185– 14·4703= 10·8932	
”	ΔQ=·2119×325– 39·0558= 29·8117	+0·57
61°35′N 4°15′W.	ΔQ=·2040×325– 38·5056= 27·7944	
61°29′N 3°41′W.	ΔQ=·1930×325– 38·0434= 24·6816	+0·87
”	ΔQ=·1897×315– 36·1311= 23·6244	+0·04
61°21′N 3°10′W.	ΔQ=·1884×315– 35·8521= 23·4939	
”	ΔQ=·2110×405– 53·8571= 31·5979	–7·08
61°14′N 2°40′W.	ΔQ=·2720×405– 63·3967= 56·7633	
”	ΔK=·3147×600–121·4825= 67·3375	–9·50
61°08′N 2°10′W.	ΔQ=·3268×600– 94·9270=101·0530	
”	ΔQ=·2625×360– 53·2698= 41·2302	–0·68
61°01′N 1°36′W.	ΔQ=·2673×360– 52·5858= 43·6422	
”	ΔQ=·0957×135– 8·4568= 4·4627	–0·66
60°56′N 1°15′W.	ΔQ=·1222×135– 9·7091= 6·7879	
		–15·80

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FAROE BANK—BUTT OF LEWIS

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SE. 3 60°54′N 8°16′W 4.5.48
181 m. 1240-1320

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·66	35·34	27·46	63		
10	·55	·34	·47	63	·0063	
20	·49	·34	·49	61	·0125	
30	·47	·34	·49	61	·0186	
50	·47	·35	·49	61	·0308	
75	·39	·34	·50	61	·0460	
100	·34	·34	·51	61	·0612	
125	·31	·28	·47	65	·0770	
150	·25	·27	·47	65	·0932	
175	·27	·28	·48	65		
[200]				65	·1257	
[250]				65	·1582	
[300]				64	·1905	
[400]				63	·2540	
[500]				61	·3160	
[550]				60	·3463	95·5000

SE. 3. 60°35′N 8°00′W 4.5.48
900 m. 0915-1020

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·94	35·36	27·43	66		
10	·92	·35	·43	66	·0066	
20	·92	·35	·43	67	·0132	
30	·90	·35	·43	67	·0299	
50	·89	·35	·43	67	·0333	
75	·87	·35	·43	68	·0502	
100	·87	·35	·43	68	·0672	
125	·87	·35	·43	69	·0843	
150	·85	·35	·43	69	·1015	
200	·86	·36	·44	69	·1360	
250	·78	·36	·45	69	·1705	
300	·63	·35	·48	67	·2045	
400	·32	·35	·53	64	·2700	
500	7·64	·27	·56	63	·3335	
[550]				55	·3630	101·8446
600	2·25	·01	·98	18		
880	–0·45	·01	28·15	–3		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
ESE. 3.			60°12′N 7°40′W			4.5.48
			582 m.			0415-0520
0	8·94	35·36	27·43	66		
10	·97	·35	·42	67	·0066	
20	·98	·36	·42	68	·0134	
30	·98	·36	·42	68	·0202	
50	·98	·35	·41	69	·0339	
75	·96	·36	·43	68	·0510	
100	·98	·35	·42	69	·0681	
125	·99	·35	·41	71	·0856	
150	·95	·36	·43	69	·1031	
200	·89	·35	·43	70	·1379	
250	·92	·35	·43	71	·1731	
300	·90	·35	·43	72	·2089	
400	·80	·35	·44	73	·2814	
[500]				19	·3274	
[550]				–8	·3302	102·4172
570	1·08	·36	28·35	–19		
SE. 2.			59°56′N 7°27′W			4.5.48
			580 m.			0100-0215
0	9·18	35·43	27·45	64		
10	·24	·41	·44	66	·0065	
20	·24	·39	·42	68	·0132	
30	·22	·38	·40	70	·0201	
50	·17	·39	·42	68	·0339	
75	·13	·37	·41	70	·0511	
100	·05	·37	·42	69	·0685	
125	·05	·36	·41	71	·0860	
150	8·94	·37	·44	68	·1034	
200	·86	·36	·44	69	·1376	
250	·90	·37	·44	70	·1724	
300	·90	·36	·44	71	·2076	
400	·83	·35	·44	73	·2796	
550	·46	·31	·46	74	·3898	105·5388
SSE. 2.			59°44′N 7°15′W			3.5.48
			1005 m.			2200-2310
0	9·34	35·37	27·37	72		
10	·30	·38	·39	70	·0071	
20	·24	·38	·40	70	·0141	
30	·21	·38	·40	70	·0211	
50	·21	·38	·40	70	·0351	
75	·12	·39	·43	68	·0523	
100	·06	·39	·43	68	·0693	
125	·09	·38	·43	69	·0864	
150	·06	·36	·41	71	·1039	
200	·00	·38	·43	70	·1391	
250	·00	·35	·41	73	·1749	
300	8·99	·36	·42	73	·2114	
400	·90	·36	·44	73	·2844	
500	·92	·36	·43	76	·3589	
[550]				77	·3972	107·2571
600	·88	·36	·44	77		
ESE. 2.			59°31′N 7°05′W			3.5.48
			1045 m.			1745-1945
0	9·46	35·42	27·39	70		
10	·35	·41	·40	69	·0070	
20	·31	·42	·41	68	·0138	
30	·20	·41	·42	68	·0206	
50	·19	·38	·40	70	·0344	
75	·12	·38	·41	70	·0519	
100	·12	·38	·42	69	·0693	
125	·12	·38	·41	71	·0868	
150	·04	·39	·44	68	·1042	
200	·00	·38	·43	70	·1387	
250	8·97	·37	·43	71	·1739	
300	·89	·37	·44	71	·2094	
400	·96	·38	·44	73	·2814	
500	·94	·37	·44	75	·3554	
[550]				76	·3932	106·3586
600	·98	·38	·44	78		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SE. 2-3			59°17′N 6°53W			3.5.48
			540 m.			1500-1550
0	9·77	35·46	27·37	72		
10	·73	·43	·35	74	·0073	
20	·65	·43	·36	73	·0147	
30	·63	·43	·37	72	·0219	
50	·57	·43	·38	72	·0363	
75	·56	·41	·36	75	·0547	
100	·60	·42	·36	75	·0735	
125	·61	·43	·37	75	·0923	
150	·60	·43	·37	75	·1111	
200	·56	·43	·38	75	·1486	
250	·54	·43	·38	76	·1864	
300	·43	·43	·40	76	·2244	
[345]				75	·2584	44·2670
400	·22	·42	·43	75	·2999	
[500]	·13	·39	·42	78	·3764	
530	·10	·38	·42	78		
[550]				80	·4159	113·2415
SE/S. 4.			59°00′N 6°40′W			3.5.48
			148 m.			1120-1155
0	9·42	35·43	27·40	69		
10	·44	·43	·40	69	·0069	
20	·41	·42	·40	70	·0139	
30	·41	·41	·39	71	·0209	
50	·41	·42	·40	70	·0350	
75	·41	·43	·41	70	·0525	
100	·42	·43	·40	71	·0701	
125	·29	·42	·42	70	·0877	
[130]				70	·0912	5·9176
140	·23	·41	·42	70		
[150]				70	·1052	
[200]				75	·1415	
[250]				78	·1798	
[300]				78	·2188	
[345]				78	·2539	42·6824
SSE. 3-4.			58°40′N 6°10′W			3.5.48
			110 m.			0800-0820
0	9·00	35·35	27·41	68		
10	·02	·35	·41	68	·0068	
20	·02	·35	·41	68	·0136	
30	·04	·35	·40	70	·0205	
50	·04	·35	·40	70	·0345	
75	8·94	·34	·41	70	·0520	
105	·95	·34	·41	70	·0730	
[130]				70	·0905	5·8566

VOLUME TRANSPORT

		Km³/hr.
60°54′N 8°16′W.	ΔQ = ·3463 × 550 − 95·5000 = 94·9650	
		−0·80
60°35′N 8°00′W.	ΔQ = ·3630 × 550 − 101·8446 = 97·8054	
		+5·28
60°12′N 7°40′W.	ΔQ = ·3302 × 550 − 102·4172 = 79·1928	
		−8·45
59°56′N 7°27′W.	ΔQ = ·3898 × 550 − 105·5388 = 108·8512	
		−0·67
59°44′N 7°15′W.	ΔQ = ·3972 × 550 − 107·2571 = 111·2029	
		+0·37
59°31′N 7°05′W.	ΔQ = ·3932 × 550 − 106·3586 = 109·9014	
		−1·61
59°17′N 6°53′W.	ΔQ = ·4159 × 550 − 113·2415 = 115·5035	
„	ΔQ = ·2584 × 345 − 44·2670 = 44·8810	−0·01
59°00′N 6°40′W.	ΔQ = ·2539 × 345 − 42·6824 = 44·9131	
„	ΔQ = ·0912 × 130 − 5·9176 = 5·9384	+0·01
58°40′N 6°10′W.	ΔQ = ·0905 × 130 − 5·8566 = 5·9084	
		−5·88

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m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
SSW. 5.			62°00′N 6°12′W			8.5.48
			122 m.			1115-1140
0	7·68	35·26	27·55	55		
10	·66	·23	·53	57	·0056	
20	·64	·26	·55	55	·0112	
30	·64	·26	·55	55	·0167	
50	·52	·26	·57	54	·0276	
75	·52	·29	·59	53	·0410	
100	·51	·27	·58	54	·0544	
118	·51	·26	·57	55		
[150]				54	·0814	
[200]				53	·1082	
[210]				53	·1135	11·9880
SW. 5.			61°54′N 5°45′W			8.5.48
			293 m.			1400-1445
0	7·72	35·26	27·54	56		
10	·79	·26	·53	57	·0057	
20	·73	·27	·55	55	·0113	
30	·63	·30	·59	52	·0167	
50	·54	·26	·57	54	·0273	
75	·39	·26	·59	53	·0407	
100	·30	·27	·61	52	·0538	
125	·26	·26	·61	51	·0667	
150	·26	·26	·61	52	·0796	
200	·23	·26	·61	53	·1059	
[210]				53	·1112	11·7828
[235]				52	·1243	14·7258
250	·15	·27	·63	52		
285	·12	·27	·64	52		
SSW. 4.			61°49′N 5°21′W			8.5.48
			175 m.			1620-1715
0	7·80	35·26	27·53	57		
10	·77	·28	·56	54	·0056	
20	·78	·26	·53	57	·0112	
30	·78	·27	·54	56	·0169	
50	·74	·28	·55	56	·0281	
75	·50	·28	·59	53	·0417	
100	·40	·28	·60	52	·0548	
125	·40	·27	·60	52	·0678	
150	·40	·27	·60	53	·0809	
170	·40	·26	·59	54		
[200]				53	·1074	
[210]				53	·1127	11·9806
[235]				52	·1258	14·9611
SSW. 5·			61°42′N 4°51′W			8.5.48
			249 m.			1915-1950
0	8·03	35·28	27·51	59		
10	·00	·28	·51	59	·0059	
20	7·98	·29	·53	57	·0117	
30	·98	·29	·53	57	·0174	
50	·96	·31	·55	56	·0287	
75	·90	·29	·54	57	·0428	
100	·64	·30	·59	53	·0566	
125	·54	·29	·59	53	·0699	
150	·44	·27	·59	54	·0833	
200	·17	·26	·62	52	·1098	
[210]				52	·1150	12·3080
240	·15	·27	·63	51		
[300]				47	·1593	
[380]				38	·1933	38·7430

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
SSW. 3.			61°35′N 4°15′W			9.5.48
			950 m.			0040-0205
0	8·72	35·35	27·46	63		
10	·72	·35	·46	64	·0064	
20	·72	·35	·46	64	·0128	
30	·68	·35	·46	64	·0192	
50	·39	·35	·51	60	·0316	
75	·03	·35	·57	54	·0459	
100	7·66	·27	·56	56	·0597	
125	·54	·27	·58	54	·0735	
150	·31	·27	·61	52	·0868	
200	6·95	·27	·66	48	·1118	
250	·55	·25	·70	44	·1348	
300	5·60	·13	·73	42	·1563	
[380]				29	·1847	38·8011
400	3·32	·01	·89	26		
SW. 4.			61°28′N 3°42′W			9.5.48
			ca. 1300 m.			0515-0630
0	8·23	35·28	27·48	62		
10	·21	·29	·49	61	·0062	
20	·13	·28	·50	60	·0122	
30	7·87	·28	·53	57	·0180	
50	·63	·26	·55	56	·0293	
75	·47	·26	·58	53	·0429	
100	·35	·26	·60	52	·0560	
125	·25	·23	·58	54	·0693	
150	6·97	·22	·61	52	·0826	
200	·37	·19	·68	46	·1071	
250	5·57	·13	·74	40	·1286	
300	4·43	·04	·79	35	·1474	
[380]				24	·1710	36·6127
[385]				23	·1720	37·4602
400	2·44	34·96	·93	21		
S. 5.			61°21′N 3°10′W			9.5.48
			1060 m.			0945-1140
0	8·24	35·37	27·55	55		
10	·18	·34	·53	57	·0056	
20	·10	·32	·52	58	·0114	
30	·00	·28	·51	59	·0172	
50	7·67	·28	·56	55	·0286	
75	·48	·26	·57	54	·0422	
100	·33	·26	·59	53	·0556	
125	·17	·26	·62	50	·0685	
150	·08	·26	·63	51	·0811	
200	6·72	·21	·65	49	·1061	
250	·17	·18	·70	44	·1293	
300	5·55	·10	·70	45	·1515	
[385]				33	·1847	38·1162
400	3·83	·01	·84	31	·1895	
[410]				29	·1925	42·7877
500	1·25	34·96	28·02	12		
SE. 4.			61°14′N 2°40′W			9.5.48
			1143 m.			1420-1535
0	8·35	35·31	27·48	62		
10	·26	·29	·48	62	·0062	
20	·23	·29	·49	61	·0124	
30	·14	·30	·50	60	·0184	
50	7·91	·28	·53	58	·0302	
75	·69	·27	·55	56	·0445	
100	·56	·36	·63	49	·0576	
125	·38	·35	·66	47	·0696	
150	·22	·26	·61	52	·0820	
200	6·80	·22	·65	49	·1072	
250	·21	·18	·69	45	·1307	
300	5·80	·16	·73	42	·1525	
400	3·57	·00	·85	30	·1885	
[410]				28	·1914	43·1660
[475]				17	·2061	56·0640
500	1·05	34·95	28·02	12		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SSE. 4.			61°08′N 2°10′W			9.5.48
			548 m.			1745-1840
0	9·29	35·37	27·38	71		
10	·28	·36	·37	72	·0072	
20	·25	·36	·38	71	·0144	
30	·20	·37	·39	71	·0215	
50	·15	·36	·39	71	·0357	
75	·02	·35	·41	70	·0533	
100	8·94	·36	·43	68	·0706	
125	·64	·35	·47	65	·0872	
150	·45	·34	·49	63	·1032	
200	·21	·33	·52	62	·1345	
250	·04	·31	·53	62	·1655	
300	7·69	·28	·56	59	·1958	
[345]				57	·2219	39·7825
400	6·90	·22	·62	55	·2528	
[475]				48	·2914	73·2218
530	5·14	·09	·75	43		
S/E. 4.			61°01′N 1°36′W			9.5.48
			143 m.			2125-2145
0	9·26	35·37	27·39	70		
10	·26	·37	·39	70	·0070	
20	·25	·36	·38	71	·0140	
30	·14	·37	·40	70	·0210	
50	8·98	·37	·43	67	·0347	
75	·93	·37	·44	67	·0515	
100	·93	·37	·44	67	·0683	
130				69	·0887	5·8020
[140]	·94	·36	·43	69		
[200]				67	·1363	
[250]				65	·1693	
[300]				62	·2011	
[345]				60	·2285	40·2430
S/E. 3.			60°56′N 1°00′W			10.5.48
			114 m.			0200-0220
0	9·04	35·35	27·40	69		
10	·00	·35	·41	68	·0068	
20	8·99	·35	·41	69	·0136	
30	·97	·35	·41	69	·0205	
50	·80	·35	·44	66	·0340	
75	·65	·35	·47	64	·0503	
110	·65	·35	·47	64	·0727	
[130]				67	·0858	5·6428

VOLUME TRANSPORT

		Km³/hr
62°00′N 6°12′W.	$\Delta Q = {\cdot}1135 \times 210 - 11.9800 = 11{\cdot}8470$	+0.08
61°54′N 5°45′W.	$\Delta Q = {\cdot}1112 \times 210 - 11{\cdot}7828 = 11{\cdot}5692$	
»	$\Delta Q = {\cdot}1243 \times 235 - 14{\cdot}7258 = 14{\cdot}4847$	−0·03
61°49′N 5°21′W.	$\Delta Q = {\cdot}1258 \times 235 - 14{\cdot}9611 = 14{\cdot}6019$	
	$\Delta Q = {\cdot}1127 \times 210 - 11{\cdot}9806 = 11{\cdot}6864$	−0·04
61°42′N 4°51′W.	$\Delta Q = {\cdot}1150 \times 210 - 12{\cdot}3080 = 11{\cdot}8420$	
»	$\Delta Q = {\cdot}1933 \times 380 - 38{\cdot}7430 = 34{\cdot}7110$	+0·93
61°35′N 4°15′W.	$\Delta Q = {\cdot}1847 \times 380 - 38{\cdot}8011 = 31{\cdot}3849$	
61°28′N 3°42′W.	$\Delta Q = {\cdot}1710 \times 380 - 36{\cdot}6217 = 28{\cdot}3583$	+0·85
»	$\Delta Q = {\cdot}1720 \times 385 - 37{\cdot}4602 = 28{\cdot}7598$	−1.19
61°21′N 3°10′W.	$\Delta Q = {\cdot}1847 \times 385 - 38{\cdot}1162 = 32{\cdot}9933$	
»	$\Delta Q = {\cdot}1925 \times 410 - 42{\cdot}7877 = 36{\cdot}1373$	+0·23
61°14′N 2°40′W.	$\Delta Q = {\cdot}1914 \times 410 - 43{\cdot}1660 = 35{\cdot}3080$	
»	$\Delta Q = {\cdot}2061 \times 475 - 56{\cdot}0640 = 41{\cdot}8335$	−6.59
61°08′N 2°10′W.	$\Delta Q = {\cdot}2914 \times 475 - 73{\cdot}2218 = 65{\cdot}1932$	
»	$\Delta Q = {\cdot}2219 \times 345 - 39{\cdot}7825 = 36{\cdot}7730$	−0·51
61°01′N 1°36′W.	$\Delta Q = {\cdot}2285 \times 345 - 40{\cdot}2430 = 38{\cdot}5895$	
»	$\Delta Q = {\cdot}0887 \times 130 - 5{\cdot}8020 = 5{\cdot}7290$	+0·06
60°56′N 1°00′W.	$\Delta Q = {\cdot}0858 \times 130 - 5{\cdot}6428 = 5{\cdot}5112$	
		−6·21

FAROE BANK—SULISKER BANK

Danish Research Vessel *DANA*
12-13 June, 1948

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
			60°54′N 8°16′W			13.6.48
			115 m.			1707-1725
0	10·05	35·34	27·23	85		
10	9·72	·34	·28	81	·0083	
25	·45	·33	·32	77	·0201	
50	8·98	·32	·39	71	·0386	
75	·87	·31	·40	71	·0564	
100	·80	·31	·41	70	·0740	
[150]				69	·1088	
[200]				68	·1431	
[300]				67	·2106	
[400]				65	·2766	
[500]				40	·3291	
[550]				34	·3476	103·9208
			60°35′N 7°58′W			13.6.48
			950 m.			1240-1313
0	10·26	35·41	27·24	84		
10	·24	·41	·25	84	·0084	
25	·05	·38	·26	83	·0209	
50	9·33	·35	·35	75	·0407	
75	·09	·34	·40	71	·0589	
100	·00	·34	·40	71	·0767	
150	8·83	·34	·43	69	·1117	
200	·72	·35	·45	68	·1459	
300	·52	·34	·48	67	·2134	
400	·19	·32	·52	65	·2794	
500	5·08	·15	·81	36	·3299	
[550]				26	·3454	105·0743
600	1·90	34·98	·99	16		
850	–0·60	·94	28·06	5		
			60°12′N 7°33′W			13.6.48
			910 m.			0928-0950
0	10·02	35·34	27·23	85		
10	9·99	·34	·24	84	·0084	
25	·97	·34	·24	85	·0211	
50	·92	·34	·25	84	·0422	
75	8·90	·33	·41	70	·0614	
100	·31	·31	·49	62	·0779	
150	7·80	·30	·55	58	·1079	
200	·39	·25	·58	55	·1361	
300	6·95	·23	·63	52	·1896	
400	5·80	·17	·74	42	·2366	
500	3·95	·04	·85	31	·2731	
[550]				23	·2866	91·9084
600	1·04	34·92	28·00	14		
850	–0·33	·92	·08	4		
			59°56′N 7°20′W			13.6.48
			450 m.			0719-0735
0	10·22	35·41	27·25	83		
10	·20	·39	·24	84	·0084	
25	·19	·39	·24	85	·0211	
50	9·65	·38	·33	77	·0413	
75	·23	·33	·36	74	·0602	
100	·10	·33	·38	73	·0786	
150	8·82	·34	·43	69	·1141	
200	·78	·33	·43	70	·1489	
300	·74	·33	·44	71	·2194	
[400]				74	·2919	
420	·62	·31	·44	74		
[500]				74	·3659	
[550]				75	·4032	115·5371

59°39′N 7°16′W 13.6.48
880-930 m. 0525-0555

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·93	35·43	27·14	94		
10	·93	·43	·14	94	·0094	
25	·93	·43	·14	94	·0235	
50	9·94	·42	·31	79	·0451	
75	·44	·38	·36	75	·0643	
100	·19	·39	·41	70	·0824	
150	·05	·39	·44	68	·1169	
200	8·98	·38	·44	69	·1511	
300	·96	·35	·42	73	·2221	
400	·92	·36	·43	74	·2956	
[500]	·88	·36	·43	76	·3706	
[550]				77	·4089	113·3776
600	·84	·35	·44	77		
850	·50	·31	·45	81		

59°31′N 7°04′W 13.6.48
990 m. 0300-0330

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·93	35·42	27·13	95		
10	·90	·42	·14	94	·0094	
25	·90	·42	·14	94	·0235	
50	·72	·38	·14	95	·0471	
75	9·58	·39	·35	76	·0685	
100	·46	·38	·36	75	·0874	
150	·17	·38	·41	71	·1239	
200	·07	·38	·42	71	·1594	
300	8·95	·34	·41	74	·2319	
400	·93	·34	·41	76	·3069	
500	·90	·34	·42	77	·3834	
[550]				78	·4222	118·0951
600	·87	·34	·43	78		

59°17′N 6°53′W 12/13.6.48
790 m. 2335-0010

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·64	35·37	26·96	111		
10	·60	·37	·97	110	·0110	
25	·60	·38	·98	110	·0275	
50	·58	·36	·97	111	·0551	
75	10·09	·36	27·23	87	·0799	
100	9·76	·39	·31	80	·1008	
150	·58	·38	·34	78	·1403	
200	·50	·39	·36	77	·1791	
300	·30	·36	·37	78	·2566	
[315]				78	·2683	45·0569
400	·10	·36	·40	77	3341	
500	·01	·35	·41	78	·4116	
[550]				79	·4509	129·5026
600	8·94	·34	·41	80		

59°00′N 6°15′W 12.6.48
75 m. 2025-2040

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·97	35·21	26·96	111		
10	·88	·22	·99	108	·0110	
25	·73	·23	27·02	106	·0270	
50	9·77	·25	·20	89	·0514	
70	·34	·25	·27	83	·0729	
[100]				80	·0974	
[150]				79	·1372	
[200]				78	·1765	
[300]				77	·2540	
[315]				77	·2656	44·2470

Volume Transport

Km³/hr.

60°54′N 8°16′W. ΔQ=·3476×550−103·9208= 87·2592
+ 0·67
60°35′N 7°58′W. ΔQ=·3454×550−105·0743= 84·8957
+ 5·44
60°12′N 7°33′W. ΔQ=·2866×550− 91·9084= 65·7216
−12·67
59°56′N 7°20′W. ΔQ=·4032×550−111·5371=110·2229
− 0·37
59°39′N 7°16′W. ΔQ=·4089×550−113·3776=111·5174
− 0·74
59°31′N 7°04′W. ΔQ=·4222×550−118·0951=114·1149
− 1·25
59°17′N 6°53′W. ΔQ=·4509×550−129·5026=118·4924
" ΔQ=·2683×315− 45·0569= 39·4576
+ 0·01
59°00′N 6°15′W. ΔQ=·2656×315− 44·2470= 39·4170

− 8·91

NOLSØ, FAROE—FLUGGA, SHETLAND

Danish Research Vessel, *DANA*
12-14 August, 1948

62°00′N 6°12′W 12.8.48
112 m. 1725-1740

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·58	35·24	27·06	101		
10	·29	·24	·11	97	·0099	
25	·02	·25	·16	92	·0241	
50	9·78	·21	·17	92	·0471	
75	·75	·22	·18	92	·0701	
100	·73	·22	·19	91	·0930	
[150]				82	·1363	
[170]				76	·1521	13·3148

61°54½′N 5°45′W 12.8.48
230 m. 1907-1931

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·37	35·24	26·91	116		
10	10·72	·26	27·05	102	·0109	
25	·30	·26	·12	96	·0257	
50	9·53	·27	·26	83	·0481	
75	·07	·29	·35	75	·0679	
100	8·77	·28	·39	72	·0863	
150	·30	·28	·47	65	·1205	
[170]				65	·1335	12·3390
200	·19	·27	·48	65	·1530	16·6365

61°49½′N 5°21′W 12.8.48
170 m. -2100

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·78	35·26	27·04	103		
10	·43	·26	·10	98	·0100	
25	9·90	·26	·19	90	·0241	
50	·17	·27	·32	78	·0451	
75	8·43	·26	·43	68	·0633	
100	·32	·27	·46	65	·0799	
[150]				65	·1124	
160	·19	·26	·47	65		
[200]				65	·1449	15·5558
[210]				65	·1514	17·0373

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
			61°43′N 4°51′W			12.8.48
			250 m.			2325-2350
0	11·27	35·26	26·95	112		
10	10·74	·28	27·06	102	·0107	
25	·31	·28	·13	95	·0255	
50	9·52	·30	·29	81	·0475	
75	8·87	·30	·39	72	·0649	
100	·60	·30	·44	67	·0823	
150	·36	·29	·47	65	·1153	
[200]	·30	·27	·46	67	·1483	
[210]				67	·1550	17·4040
220	·29	·26	·46	68		
[300]				63	·2133	
[400]				55	·2723	
[420]				53	·2831	63·8015
			61°35′N 4°15′W			13.8.48
			790 m.			0208-0245
0	11·33	35·27	26·94	113		
10	10·98	·27	27·01	106	·0110	
25	·62	·27	·07	101	·0265	
50	9·94	·27	·19	90	·0504	
75	8·78	·29	·40	71	·0638	
100	·50	·27	·43	68	·0812	
150	·23	·27	·47	65	·1144	
200	·03	·27	·50	63	·1464	
300	7·37	·22	·56	59	·2074	
400	6·22	·15	·66	50	·2619	
[420]				43	·2712	62·4336
[460]				28	·2853	73·5186
500	1·06	34·94	28·01	13		
600	–0·49	·92	·08	4		
			61°28′N 3°41′W			13.8.48
			1260 m.			0540-0618
0	11·20	35·28	26·98	109		
10	10·52	·24	27·07	100	·0104	
25	·36	·24	·10	98	·0252	
50	9·17	·26	·32	78	·0472	
75	8·51	·30	·45	66	·0652	
100	·32	·29	·48	64	·0814	
150	·07	·27	·50	62	·1129	
200	7·76	·26	·54	59	·1431	
300	6·74	·19	·62	53	·1991	
380	5·20	·09	·74	42	·2371	
[405]				36	·2469	56·3270
[460]				20	·2623	70·3300
475	1·87	34·96	·97	17		
575	0·48	·91	28·03	10		
			61°18½′N 3°10′W			13.8.48
			1340 m.			0840-0910
0	11·20	35·29	26·98	109		
10	·18	·29	·99	108	·0108	
25	10·53	·29	27·10	98	·0262	
50	9·03	·29	·36	74	·0477	
75	8·35	·28	·46	65	·0651	
100	·14	·28	·49	62	·0810	
150	7·82	·24	·51	61	·1118	
200	·23	·22	·58	55	·1408	
300	5·87	·12	·68	47	·1918	
400	3·03	34·93	·85	29	·2298	
[405]				28	·2312	54·4891
[415]				28	·2341	56·8159
500	0·92	·93	28·01	12		

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
			61°14′N 2°40′W			13.8.48
			1050 m.			1530-
0	11·78	35·34	26·91	116		
10	·73	·34	·92	115	·0116	
25	·26	·32	27·00	108	·0283	
50	10·05	·32	·21	88	·0528	
75	9·32	·34	·35	75	·0732	
100	8·88	·33	·42	69	·0912	
150	·42	·31	·47	65	·1247	
200	·07	·25	·48	65	·1572	
300	7·37	·24	·58	57	·2182	
385	6·18	·15	·67	49	·2632	
[415]				44	·2772	64·7816
480	3·58	34·98	·83	33	·3022	
[485]				32	·3038	85·0471
575	0·83	·94	28·03	11		
			61°07′N 2°01′W			13.8.48
			460 m.			2148-2210
0	12·14	35·37	26·87	119		
10	·13	·36	·86	120	·0120	
25	11·86	·37	·92	115	·0296	
50	10·93	·37	27·10	99	·0564	
75	·10	·41	·27	83	·0792	
100	9·91	·38	·28	83	·1000	
150	·67	·40	·34	78	·1402	
200	·63	·40	·35	78	·1792	
305	·40	·39	·38	77	·2606	42·4615
420	8·58	·33	·46	72	·3463	
[485]				57	·3882	101·2295
			61°00′N 1°33′W			14.8.48
			145 m.			0535-0555
0	11·82	35·34	26·91	116		
10	·80	·35	·92	115	·0116	
25	·68	·34	·93	114	·0288	
50	·56	·34	·96	112	·0570	
75	10·17	·35	27·22	88	·0820	
100	9·64	·36	·31	80	·1030	
[125]				78	·1228	8·3060
140	·50	·38	·35	77		
[150]				77	·1422	
[200]				78	·1810	
[305]				77	·2624	42·9720
			6°53′N 1°06′W			14.8.48
			110 m.			0720-0735
0	11·72	35·28	26·88	118		
10	·72	·31	·90	117	·0118	
25	·72	·30	·89	118	·0294	
50	·10	·32	27·02	106	·0574	
75	9·68	·34	·29	81	·0808	
100	·45	·34	·33	78	·1007	
[125]				77	·1201	8·2093

Volume Transport

		Km³/hr.
62°00′N 6°12′W.	ΔQ=·1521×170− 13·3148=12·5422	+0·61
61°54½′N 5°45′W.	ΔQ=·1335×170− 12·3390=10·3560	
”	ΔQ=·1530×200− 76·6365=13·9635	+0·15
61°49½′N 5°21′W.	ΔQ=·1449×200− 15·5558=13·4242	
”	ΔQ=·1514×210− 17·0373=14·7567	−0·11
61°43′N 4°51′W.	ΔQ=·1550×210− 17·4040=15·1460	
”	ΔQ=·2831×420− 63·8015=55·1005	+1·02
61°35′N 4°15′W.	ΔQ=·2712×420− 62·4336=51·4704	
”	ΔA=·2853×460− 73·5186=57·7194	+2·08
61°28′N 3°41′W.	ΔQ=·2623×460− 70·3300=50·3280	
”	ΔQ=·2469×405− 56·3270=43·6675	+1·27
61°18½′N 3°10′W.	ΔQ=·2312×405− 54·4891=39·1469	
”	ΔQ=·2341×415− 56·8159=40·3356	−2·79
61°14′N 2°40′W.	ΔQ=·2772×415− 64·7816=50·2564	
”	ΔQ=·3038×485− 85·0471=62·2959	−6·98
61°07′N 2°01′W.	ΔQ=·3882×485−101·2295=87·0475	
”	ΔQ=·2606×305− 42·4615=37·0215	−0·01
61°00′N 1°33′W.	ΔQ=·2624×305− 42·9720=37·0600	
”	ΔQ=·1228×125− 8·3060= 7·0440	+0·07
60°53′N 1°06′W.	ΔQ=·1201×125− 8·2093= 6·8032	
		−4·69

1949

VIDERØ, FAROE, NORTHWARD, ON LONGITUDE 6°35′W TO LATITUDE 63°24′N.

F.R.S. *SCOTIA*

6-7 March, 1949

WSW. 3. 62°32′N 6°35′W 6.3.49
110 m. 0910-1025

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	6·84	35·27	27·68	43		
10	·86	·29	·70	41	·0042	
20	·86	·27	·68	43	·0084	
30	·87	·24	·66	45	·0128	
50	·85	·23	·65	46	·0129	
75	·79	·21	·57	54	·0344	
105	·36	·21	·70	42	·0488	
[135]				48	·0623	4·1553

W. 5. 62°43′N 6°35′W 6.3.49
164 m. 1145-1230

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	7·48	35·25	27·58	52		
10	·49	·25	·58	52	·0052	
20	·49	·25	·58	52	·0104	
30	·49	·25	·58	53	·0156	
50	·48	·25	·58	53	·0262	
75	·49	·25	·58	53	·0394	
100	·49	·24	·57	55	·0529	
125	·50	·25	·58	54		
[135]	·50	·25	·58	54	·0720	4·8116
155	·50	·25	·58	55	·0829	
[200]				55	·1077	
[300]				50	·1602	24·0441

SW. 3-4. 62°55′N 6°35′W 6.3.49
927 m. 1410-1620

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	7·63	35·21	27·52	58		
10	·66	·22	·53	57	·0058	
20	·66	·22	·53	57	·0115	
30	·65	·22	·53	57	·0172	
50	·64	·23	·53	58	·0287	
75	·60	·23	·54	57	·0431	
100	·55	·23	·54	58	·0575	
150	·63	·21	·52	61	·0873	
200	·58	·21	·53	60	·1175	
250	6·52	·20	·67	47	·1443	
[255]				47	·1467	18·8855
300	5·68	·02	·64	50	·1685	25·9780
400	4·44	34·90	·68	47		

WSW. 4. 63°06′N 6°35′W 6.3.3.49
1417 m. 1740-1900

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	7·40	35·19	27·54	56		
10	·42	·19	·54	56	·0056	
20	·40	·19	·54	56	·0112	
30	·21	·19	·56	54	·0167	
50	·18	·18	·56	55	·0276	
75	6·90	·17	·60	51	·0408	
100	7·12	·17	·57	55	·0540	
150	5·46	·07	·70	43	·0785	
[180]				39	·0908	8·5865
200	4·34	34·99	·77	36	·0983	
250	1·69	·90	·94	19	·1121	
[255]				19	·1131	16·2900
300	0·87	·78	·98	22		

WSW. 3. 63°18½′N 6°35′W 6.3.49
1417 m. 2200-2350

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	6·88	35·14	27·57	53		
10	·91	·17	·59	51	·0052	
20	·87	·14	·57	53	·0104	
30	·67	·14	·60	51	·0156	
50	·60	·16	·63	48	·0255	
75	·46	·14	·63	48	·0375	
100	·01	·15	·69	43	·0489	
[140]				34	·0643	4·7765
150	5·11	·16	·81	32	·0677	
[180]				33	·0775	7·6055
200	3·09	34·87	·80	33		

63°24′N 6°35′W 7.3.49
(Interpolated Station)

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	5·20	35·01	27·69	42		
10	·26	·02	·69	42	·0042	
20	·23	·01	·68	43	·0084	
30	·09	·01	·70	41	·0126	
50	4·96	·02	·72	39	·0206	
75	·70	·01	·74	38	·0302	
100	·28	·00	·78	34	·0392	
140				30	·0520	3·8475
150	3·46	34·96	·84	29		
200	·08	·86	·79	34		

Volume Transport

		Km³/hr
62°32′N 6°35′W.	ΔQ=·0623×135− 4·1553= 4·2552	−0·18
62°43′N 6°35′W.	ΔQ=·0720×135− 4·8116= 4·9084	
”	ΔQ=·1602×300−24·0441=24·0159	−0·15
62°55′N 6°35′W.	ΔQ=·1685×300−25·9780=24·5720	
”	ΔQ=·1467×255−18·8855=18·5230	+1·66
63°06′N 6°35′W.	ΔQ=·1131×255−16·2900=12·5505	
”	ΔQ=·0908×180− 8·5865= 7·7575	+0·39
63°18½′N 6°35′W.	ΔQ=·0775×180− 7·6055= 6·3445	
”	ΔQ=·0643×140− 4·7765= 4·2255	+0·22
63°24′N 6°35′W.	ΔQ=·0520×140− 3·8475= 3·4325	
		+1·94

NOLSØ, FAROE—FLUGGA, SHETLAND
F.R.S. *SCOTIA*
8-10 March, 1949

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
S. 5.		62°00′N 6°12′W 117 m.				8.3.49 2110-2225
0	6·50	35·20	27·67	44		
10	·52	·19	·65	46	·0045	
20	·51	·18	·65	46	·0091	
30	·51	·18	·65	46	·0137	
50	·40	·17	·66	45	·0228	
75	·23	·17	·68	44	·0339	
100	·26	·17	·68	44	·0449	
114	·28	·17	·68	44		
[145]				48	·0656	4·7495
S. 5-6.		61°54′N 5°45′W 269 m.				9.3.49 0015-0105
0	6·78	35·17	27·61	49		
10	·79	·17	·61	49	·0049	
20	·80	·17	·60	50	·0099	
30	·80	·17	·60	51	·0149	
50	·80	·17	·60	51	·0251	
75	·81	·17	·60	51	·0379	
100	·82	·17	·60	52	·0508	
[145]				52	·0742	5·3313
150	·82	·17	·60	52	·0768	
200	·84	·17	·60	53	·1030	
[225]				50	·1159	12·9400
260	·22	·17	·68	47		
S. 5-6.		61°49′N 5°21′W 185 m.				9.3.49 0245-0405
0	6·88	35·17	27·60	50		
10	·90	·17	·60	50	·0050	
20	·90	·17	·60	50	·0100	
30	·90	·17	·60	51	·0150	
50	·90	·17	·60	51	·0252	
75	·90	·17	·60	51	·0380	
100	·91	·17	·59	53	·0510	
150	·71	·17	·62	51	·0770	
180	·92	·17	·59	54		
[200]				55	·1035	
[225]				55	·1173	13·0020
[230]				55	·1200	13·5945
SE. 4-5.		61°42′N 4°51′W 271 m.				9.3.49 0600-0700
0	7·06	35·17	27·58	52		
10	·09	·18	·58	52	·0052	
20	·09	·19	·58	52	·0104	
30	·09	·19	·58	53	·0156	
50	·09	·19	·58	53	·0262	
75	·10	·21	·60	51	·0392	
100	·10	·22	·60	52	·0521	
150	·11	·20	·58	55	·0789	
200	·11	·21	·59	54	·1061	
[230]				55	·1225	13·9397
265	·09	·20	·59	56		
[300]				52	·1591	
[310]				51	·1643	25·3877
S/E. 5.		61°35′N 4°15′W 1074 m.				9.3.49 0910-1100
0	7·05	35·23	27·61	49		
10	·04	·22	·61	49	·0049	
20	6·92	·22	·62	49	·0098	
30	·90	·22	·63	48	·0146	
50	·80	·21	·64	47	·0241	
75	·83	·20	·62	49	·0361	
100	·81	·20	·63	49	·0483	
150	·44	·12	·60	52	·0735	
200	·12	·17	·69	45	·0977	
250	5·68	·09	·68	46	·1205	
300	4·27	34·93	·72	42	·1425	
[310]				42	·1467	23·2155
[380]				40	·1753	34·4815
400	3·68	·88	·75	40		
S. 4.		61°28′N 3°42′W 1130 m.				9.3.49 1245-1410
0	7·01	35·21	27·60	50		
10	·04	·20	·60	50	·0050	
20	·03	·20	·60	50	·0100	
30	·03	·21	·60	51	·0150	
50	·03	·21	·60	51	·0252	
75	·01	·18	·58	53	·0382	
100	·02	·19	·59	53	·0514	
150	·03	·19	·59	54	·0782	
200	·04	·19	·59	54	·1052	
250	6·68	·18	·63	51	·1314	
300	·52	·12	·60	55	·1579	
[380]				37	·1947	37·6160
400	4·42	·09	·84	32		
S. 3-4.		61°21′N 3°10′W 1277 m.				9.3.49 1630-1815
0	7·07	35·25	27·64	46		
10	·10	·21	·60	50	·0048	
20	·10	·21	·60	50	·0098	
30	·10	·21	·60	51	·0148	
50	·07	·21	·60	51	·0250	
75	·06	·18	·58	53	·0380	
100	·04	·18	·58	54	·0514	
150	6·91	·14	·56	56	·0789	
200	·46	·14	·63	50	·1054	
250	·00	·08	·64	50	·1304	
300	4·47	34·94	·71	43	·1536	
[320]				39	·1618	26·5370
[380]				29	·1824	36·8230
400	2·04	·87	·89	25		
ESE. 3.		61°14′N 2°40′W 880 m.				9.3.49 2005-2050
0	8·60	35·30	27·43	66		
10	·65	·30	·42	67	·0066	
20	·67	·30	·42	68	·0134	
30	·67	·31	·43	67	·0202	
50	·68	·32	·44	66	·0335	
75	·65	·33	·45	66	·0500	
100	·41	·33	·49	63	·0661	
150	·67	·31	·43	69	·0991	
200	·07	·24	·47	66	·1329	
250	7·95	·24	·49	65	·1657	
300	6·99	·18	·59	56	·1959	
[320]				55	·2070	33·7970
400	·47	·14	·63	53	·2504	
[500]				31	·2924	
[545]				20	·3039	92·6398
600	0·61	34·96	28·06	8		

m	t°C	S‰	σ_t	10⁵δ	ΔD	$\int_0^{z_1}\Delta D\,dz$
SSE. 2.			61°08′N 2°10′W			9/10.3.49
			432 m.			2240-0030
0	8·85	35·30	27·39	70		
10	·91	·30	·38	71	·0070	
20	·91	·31	·39	70	·0140	
30	·91	·32	·40	70	·0210	
50	·91	·30	·38	72	·0352	
75	·91	·32	·40	71	·0531	
100	·91	·30	·38	73	·0711	
150	·92	·31	·39	73	·1076	
200	·94	·31	·39	74	·1444	
250	·94	·31	·39	75	·1816	
[280]				76	·2042	28·2378
300	·94	·32	·39	76	·2194	
400	·78	·34	·44	73	·2939	
[500]				46	·3534	
[545]				33	·3712	106·8093
SE. 3.			61°01′N 1°36′W			10.3.49
			130 m.			0215-0250
0	8·50	35·30	27·45	64		
10	·53	·31	·45	65	·0064	
20	·51	·32	·46	64	·0128	
30	·46	·31	·46	64	·0192	
50	·43	·31	·47	63	·0319	
75	·43	·30	·46	65	·0479	
100	·43	·30	·46	65	·0641	
[120]				66	·0772	4·6095
125	·42	·30	·46	66	·0805	
[150]				67	·0971	
[200]				69	·1311	
[280]				76	·1891	25·7370
SSE. 3.			60°56′N 1°00′W			10.3.49
			105 m.			0615-0720
0	8·20	35·29	27·49	61		
10	·25	·29	·48	62	·0062	
20	·25	·31	·50	60	·0123	
30	·19	·27	·47	63	·0185	
50	·04	·27	·50	61	·0309	
75	7·97	·27	·51	60	·0460	
100	·91	·27	·52	60	·0610	
[120]				63	·0733	4·4132

VOLUME TRANSPORT

		Km³/hr
62°00′N 6°12′W.	ΔQ = ·0656 × 145 − 4·7495 — 4·7625	−0·19
61°54′N 5°45′W.	ΔQ = ·0742 × 145 − 5·3313 = 5·4277	
”	ΔQ = ·1159 × 225 − 12·9400 = 13·1375	−0·07
61°49′N 5°21′W.	ΔQ = ·1173 × 225 − 13·0020 = 13·3905	
”	ΔQ = ·1200 × 230 − 13·5945 = 14·0045	−0·06
61°42′N 4°51′W.	ΔQ = ·1225 × 230 − 13·9397 = 14·2353	
”	ΔQ = ·1643 × 310 − 25·3877 = 25·5453	+0·92
61°35′N 4°15′W.	ΔQ = ·1467 × 310 − 23·2155 = 22·2615	
”	ΔQ = ·1753 × 380 − 34·4815 = 32·1325	−1·19
61°28′N 3°42′W.	ΔQ = ·1947 × 380 − 37·6160 = 36·3700	
61°21′N 3°10′W.	ΔQ = ·1824 × 380 − 36·8230 = 32·4890	+1·09
”	ΔQ = ·1618 × 320 − 26·5370 = 25·2390	−2·03
61°14′N 2°40′W.	ΔQ = ·2070 × 320 − 33·7970 = 32·4430	
”	ΔQ = ·3039 × 545 − 92·6398 = 72·9857	−6·35
61°08′N 2°10′W.	ΔQ = ·3712 × 545 − 106·8093 = 95·4947	
”	ΔQ = ·2042 × 280 − 28·2378 = 28·9382	+0·49
61°01′N 1°36′W.	ΔQ = ·1891 × 280 − 25·7370 = 27·2110	
”	ΔQ = ·0772 × 120 − 4·6095 = 4·6545	+0·08
60°56′N 1°00′W.	ΔQ = ·0733 × 120 − 4·4132 = 4·3828	
		−7·31

LATITUDE 62°15′ N, LONGITUDE 9°30′W —FAROE BANK—BUTT OF LEWIS

F.R.S. *SCOTIA*
29-30 April, 7-8 May, 1949

m	t°C	S‰	σ_t	10⁵δ	ΔD	$\int_0^{z_1}\Delta D\,dz$
NW. 4.			62°15′N 9°30′W			7.5.49
			570 m.			1830-1945
0	7·74	35·09	27·40	69		
10	·77	·16	·45	65	·0067	
20	·77	·10	·40	70	·0135	
30	·77	·09	·40	70	·0205	
50	·78	·17	·47	63	·0338	
75	·77	·12	·42	69	·0503	
100	·77	·09	·40	71	·0678	
150	·78	·08	·39	73	·1038	
200	·77	·09	·40	73	·1403	
300	·75	·09	·40	74	·2138	
400	·49	·26	·58	59	·2803	
[525]	6·66	·20	·65	54	·3509	95·6274
[550]	·47	·18	·66	53		
E. 2.			62°02′ 9°18′W			7/8.5.49
			476 m.			2330-0040
0	7·83	35·24	27·51	59		
10	·87	·25	·51	59	·0059	
20	·83	·26	·53	57	·0117	
30	·83	·26	·53	57	·0174	
50	·86	·26	·52	59	·0290	
75	·84	·27	·53	58	·0436	
100	·84	·26	·53	59	·0582	
150	·87	·26	·53	60	·0880	
200	·85	·26	·53	60	·1180	
300	·66	·25	·55	60	·1780	
400	·01	·24	·63	54	·2350	
450	5·18	·12	·78	39	·2582	
[525]				35	·2860	79·8995
N. 3.			61°48′N 9°06′W			8.5.46
			577 m.			0245-0430
0	7·90	35·27	27·52	58		
10	·91	·28	·53	57	·0058	
20	·93	·27	·52	58	·0116	
30	·93	·27	·52	58	·0174	
50	·93	·27	·52	59	·0291	
75	·93	·26	·51	60	·0440	
100	·93	·26	·51	61	·0591	
150	·92	·26	·51	61	·0896	
200	·91	·26	·51	62	·1204	
300	·93	·26	·52	63	·1829	
400	·81	·26	·53	64	·2464	
500	·40	·25	·59	60	·3084	
525	6·68	·18	·63	56	·3229	84·1573
550	4·87	·09	·78	40		
[600]				66	·3714	
[660]				69	·4119	133·7551
N. 4.			61°35′N 8°53′W			8.5.49
			824 m.			0610-0845
0	7·92	35·25	27·50	60		
10	·96	·26	·51	59	·0060	
20	·96	·25	·50	60	·0120	
30	·96	·25	·50	60	·0180	
50	·96	·25	·50	61	·0301	
75	8·01	·24	·48	63	·0456	
100	7·99	·25	·49	62	·0612	
150	8·02	·26	·50	62	·0922	
200	·00	·26	·50	63	·1234	
300	·00	·26	·50	65	·1874	
400	·00	·24	·48	69	·2544	
500	7·87	·24	·50	69	·3234	
600	·28	·17	·54	66	·3909	
[620]				67	·4042	122·4432
[660]				69	·4314	139·1672
700	6·90	·05	·50	71		
800	−0·45	34·91	28·08	4		

N. 2. 61°21½′N 8°41′W 8.5.49
238 m. 0955-1120

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	7·95	35·26	27·51	59		
10	·95	·27	·51	59	·0059	
20	·95	·35	·58	52	·0115	
30	·95	·27	·51	59	·0171	
50	·95	·26	·51	60	·0290	
75	·95	·26	·51	60	·0440	
100	·95	·26	·51	61	·0591	
150	·96	·26	·51	61	·0896	
[170]				62	·0999	9·6568
230	·96	·25	·50	64	·1377	
[300]				65	·1829	
[400]				69	·2499	
[500]				69	·3189	
[600]				66	·3864	
[620]				67	·3997	121·2118

N. 1-2. 61°08′N 8°29′W 8.5.49
100 m. 1430-1500

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·06	35·19	27·43	66		
10	7·94	·23	·48	62	·0064	
20	·94	·21	·47	63	·0126	
30	·94	·21	·47	63	·0189	
50	·96	·22	·47	63	·0315	
75	·95	·21	·47	64	·0474	
95	·91	·25	·51	60	·0598	
[125]				61	·0780	4·9137
[170]				62	·1057	9·0469

VOLUME TRANSPORT

		Km³/hr
62°15′N 9°30′W.	$\Delta Q = \cdot 3509 \times 525 - 95{\cdot}6274 = 88{\cdot}5951$	+5·12
62°02′N 9°18′W.	$\Delta Q = \cdot 2860 \times 525 - 79{\cdot}8995 = 70{\cdot}2505$	−4·23
61°48′N 9°06′W.	$\Delta Q = \cdot 3229 \times 525 - 84{\cdot}1573 = 85{\cdot}3652$	
”	$\Delta Q = \cdot 4119 \times 660 - 133{\cdot}7551 = 138{\cdot}0989$	−2·09
61°35′N 8°53′W.	$\Delta Q = \cdot 4314 \times 660 - 139{\cdot}1672 = 145{\cdot}5568$	
”	$\Delta Q = \cdot 4042 \times 620 - 122{\cdot}4432 = 128{\cdot}1608$	+0·44
61°21½′N 8°41′W.	$\Delta Q = \cdot 3997 \times 620 - 121{\cdot}2118 = 126{\cdot}6022$	
”	$\Delta Q = \cdot 0999 \times 170 - 9{\cdot}6568 = 7{\cdot}3262$	−0·45
61°08′N 8°29′W.	$\Delta Q = \cdot 1057 \times 170 - 9{\cdot}0469 = 8{\cdot}9221$	
”	$\Delta Q = \cdot 0780 \times 125 - 4{\cdot}9137 = 4{\cdot}8363$	−0·04
60°54′N 8°16′W.	$\Delta Q = \cdot 0793 \times 125 - 4{\cdot}9430 = 4{\cdot}9695$	
		−1·25

SW. 1-2. 60°54′N 8°16′W 8.5.49
146 m. 1750-1900

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·15	35·20	27·43	66		
10	7·94	·20	·46	64	·0065	
20	·89	·22	·48	62	·0128	
30	·84	·25	·51	59	·0188	
50	8·05	·20	·44	66	·0313	
75	7·88	·20	·47	64	·0475	
100	·88	·21	·48	63	·0634	
125	·89	·21	·48	64	·0793	4·9430
140	·91	·20	·46	66		
[150]				66	·0955	
[200]				70	·1295	
[300]				66	·1975	
[400]				72	·2665	
[500]				74	·3375	
[550]				74	·3745	100·3030

W. 1-2. 60°45′N 8°08′W 8.5.49
915 m. 2000-2115

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·73	35·26	27·38	71		
10	·64	·26	·40	69	·0070	
20	·64	·25	·39	70	·0140	
30	·59	·25	·40	70	·0210	
50	·60	·25	·40	70	·0350	
75	·59	·26	·41	70	·0525	
100	·58	·27	·42	69	·0699	
150	·59	·26	·41	71	·1049	
200	·57	·26	·41	72	·1407	
300	·73	·28	·49	66	·2097	
400	·38	·26	·44	73	·2792	
500	·01	·19	·44	74	·3527	
[550]	7·88	·18	·45	74	·3897	106·1288
600	·79	·17	·48	72		

WSW. 6. 60°35′N 8°00′W 30.4.49
900 m. 2020-2212

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·65	35·26	27·40	69		
10	·65	·26	·40	69	·0069	
20	·68	·28	·41	69	·0138	
30	·68	·26	·39	71	·0208	
50	·69	·24	·38	72	·0351	
75	·67	·21	·36	74	·0534	
100	·68	·20	·35	76	·0722	
150	·69	·26	·39	73	·1095	
200	·38	·22	·41	72	·1457	
300	·38	·21	·40	75	·2192	
400	7·12	·15	·55	62	·2877	
500	2·64	34·93	·89	26	·3317	
[550]	0·75	·86	·98	15	·3419	105·8687
600	·26	·85	28·01	12		

WSW. 5. 60°23½′N 7°49½′W 30.4.49
1010 m. 1650-1820

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·88	35·30	27·39	70		
10	·81	·30	·40	69	·0070	
20	·82	·30	·40	70	·0140	
30	·77	·30	·41	69	·0210	
50	·75	·32	·43	67	·0346	
75	·73	·32	·43	68	·0515	
100	·74	·32	·43	68	·0685	
150	·82	·27	·38	74	·1040	
200	·83	·26	·40	73	·1408	
300	·38	·26	·44	71	·2128	
400	7·87	·18	·47	70	·2833	
500	6·13	·13	·66	52	·3443	
[550]	3·36	34·96	·84	32	·3653	105·4847
600	1·67	·86	·91	23		

NW. 5. 60°12′N 7°40′W 30.4.49
787 m. 1400-1540

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·72	35·30	27·42	67		
10	·72	·31	·42	67	·0067	
20	·72	·30	·42	68	·0135	
30	·71	·30	·42	68	·0203	
50	·72	·30	·42	68	·0339	
75	·72	·30	·42	69	·0510	
100	·73	·30	·42	69	·0683	
150	·74	·31	·42	70	·1031	
200	·72	·29	·41	72	·1386	
300	·74	·30	·42	73	·2111	
400	·62	·30	·43	74	·2846	
500	·45	·30	·46	73	·3581	
[550]	6·75	·25	·67	52	·3893	106·8154

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
NNW. 3.			59°56′N 7°27′W			30.4.49
			527 m.			0935-1235
0	8·68	35·32	27·44	65		
10	·71	·32	·43	66	·0066	
20	·69	·32	·44	66	·0132	
30	·67	·31	·43	67	·0198	
50	·68	·31	·43	67	·0332	
75	·68	·31	·43	68	·0501	
100	·72	·31	·43	68	·0671	
150	·71	·29	·41	71	·1019	
200	·71	·29	·41	72	·1387	
300	·74	·30	·41	74	·2117	
400	·02	·30	·52	65	·2812	
500	7·89	·27	·53	66	·3467	
[550]	·85	·25	·52	68	·3802	105·3057
NW. 3.			59°44′N 7°15′W			30.4.49
			1004 m.			0600-0910
0	8·89	35·32	27·41	68		
10	·91	·32	·42	67	·0068	
20	·91	·33	·43	67	·0135	
30	·91	·32	·42	68	·0203	
50	·91	·32	·42	68	·0339	
75	·90	·31	·40	71	·0513	
100	·90	·32	·40	71	·0691	
150	·92	·33	·42	70	·1044	
200	·93	·32	·41	72	·1399	
300	·81	·31	·41	74	·2129	
400	·79	·32	·42	75	·2874	
500	·77	·31	·42	77	·3634	
[550]	·74	·31	·42	78	·4022	108·1965
600	·71	·30	·42	79		
WNW. 3.			59°31′N 7°05′W			30.4.49
			1097 m.			0245-0430
0	9·12	35·31	27·36	73		
10	·19	·29	·33	76	·0074	
20	·16	·30	·35	74	·0149	
30	·16	·28	·33	76	·0224	
50	·17	·30	·34	76	·0376	
75	·15	·31	·36	75	·0565	
100	·14	·29	·34	77	·0755	
150	·15	·27	·33	79	·1145	
200	8·95	·30	·38	75	·1530	
300	·97	·28	·36	79	·2300	
400	·86	·27	·37	80	·3095	
500	·82	·25	·36	83	·3910	
[550]	·82	·29	·39	81	·4320	116·9237
600	·81	·32	·42	79		
NW/W. 3.			59°17′N 6°53′W			29/30.4.49
			715 m.			2230-0100
0	9·01	35·31	27·38	71		
10	·01	·28	·36	73	·0072	
20	·01	·30	·37	72	·0144	
30	·02	·27	·35	74	·0217	
50	·02	·27	·35	75	·0356	
75	·02	·28	·35	75	·0544	
100	·02	·29	·36	75	·0732	
150	·02	·30	·37	75	·1107	
200	·01	·27	·35	78	·1490	
300	·00	·28	·36	79	·2275	
[360]				81	·2755	48·6225
400	8·93	·26	·35	82	·3080	
500	·88	·27	·37	82	·3900	
[550]	·83	·26	·37	83	·4312	115·7375
600	·78	·26	·37	84		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
NW. 3-4.			59°00′N 6°40′W			29.4.49
			154 m.			1930-2020
0	9·41	35·34	27·34	75		
10	·46	·32	·31	78	·0076	
20	·48	·32	·31	78	·0154	
30	·48	·30	·29	80	·0233	
50	·47	·31	·30	80	·0393	
75	·47	·32	·31	79	·0592	
100	·46	·32	·31	80	·0791	
125	·48	·32	·31	80	·0991	
[140]				81	·1112	7·7372
150	·47	·32	·31	81	·1192	
[200]				82	·1600	
[300]				82	·2420	
[360]				82	·2912	51·9648
NW. 5.			58°50′N 6°26′W			29.4.49
			129 m.			1640-1720
0	9·28	35·31	27·33	76		
10	·35	·31	·32	77	·0076	
20	·34	·30	·32	77	·0153	
30	·34	·32	·33	76	·0229	
50	·35	·34	·35	75	·0380	
75	·35	·30	·32	78	·0571	
100	·36	·34	·35	76	·0763	
[120]				78	·0917	5·4888
125	·34	·31	·32	79		
[140]				80	·1075	7·4848
N. 5.			58°40′N 6°10′W			29.4.49
			110 m.			1400-1440
0	8·57	35·16	27·33	76		
10	·63	·16	·32	77	·0076	
20	·64	·11	·28	81	·0155	
30	·65	·16	·32	77	·0234	
50	·70	·17	·32	78	·0389	
75	·70	·14	·30	80	·0587	
105	·82	·17	·30	81	·0829	
[120]				80	·0950	5·6492

VOLUME TRANSPORT

		Km³/hr
60°54′N 8°16′W.	ΔQ = ·3745 × 550 − 100·3030 = 105·6720	
		−0·72
60°45′N 8°08′W.	ΔQ = ·3897 × 550 − 106·1288 = 108·2062	
		+7·37
60°35′N 8°00′W.	ΔQ = ·3419 × 550 − 105·8687 = 82·1763	
		−3·76
60°23½′N 7°49½′W	ΔQ = ·3653 × 550 − 105·4847 = 95·4303	
		−3·37
60°12′N 7°40′W.	ΔQ = ·3893 × 550 − 106·8154 = 107·2996	
		+1·00
59°56′N 7°27′W.	ΔQ = ·3802 × 550 − 105·3057 = 103·8043	
		−2·63
59°44′N 7°15′W.	ΔQ = ·4022 × 550 − 108·1965 = 113·0135	
		−2·19
59°31′N 7°05′W.	ΔQ = ·4320 × 550 − 116·9237 = 120·6763	
		−0·21
59°17′N 6°53′W.	ΔQ = ·4312 × 550 − 115·7375 = 121·4225	
”	ΔQ = ·2755 × 360 − 48·6225 = 50·5575	
		−0·66
59°00′N 6°40′W.	ΔQ = ·2912 × 360 − 51·9648 = 52·8672	
”	ΔQ = ·1112 × 140 − 7·7372 = 7·8308	
		+0·08
58°50′N 6°26′W.	ΔQ = ·1075 × 140 − 7·4848 = 7·5652	
”	ΔQ = ·0917 × 120 − 5·4888 = 5·5152	
		−0·07
58°40′N 6°10′W.	ΔQ = ·0950 × 120 − 5·6492 = 5·7508	
		−5·16

VIDERØ, FAROE, NORTHWARD ON LONGITUDE 6°35′W TO LATITUDE 63°30′N

F.R.S. *SCOTIA*

21-22 July, 1949

SE. 4. 62°33′N 6°35′W 21.7.49
106 m. 2135-2230

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	9·48	35·16	27·18	90		
10	·43	·12	·16	92	·0091	
20	8·93	·12	·24	85	·0179	
30	·91	·12	·24	85	·0264	
50	·89	·14	·27	82	·0431	
75	·87	·14	·27	83	·0637	
100	·82	·15	·28	82	·0843	
[155]				72	·1267	10·0845

SE. 4. 62°43′N 6°35′W 21.7.49
203 m. 2325-2355

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·37	35·17	27·04	103		
10	·39	·17	·03	104	·0104	
20	·35	·14	·02	106	·0209	
30	8·99	·13	·24	85	·0305	
50	·67	·15	·31	79	·0469	
75	·44	·15	·34	76	·0663	
100	·31	·18	·38	73	·0849	
150	·13	·18	·41	71	·1209	
[155]				72	·1248	10·3113
190	·95	·20	·30	82		
[200]				82	·1591	
[300]				69	·2346	
[380]				63	·2874	57·2545

SE. 5. 62°55′N 6°35′W 22.7.49
613 m. 0055-0145

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	11·29	35·16	26·87	119		
10	·27	·16	·87	120	·0120	
20	10·37	·15	27·02	106	·0233	
30	·31	·15	·03	105	·0339	
50	9·13	·19	·27	82	·0526	
75	8·48	·17	·35	75	·0722	
100	9·02	·22	·31	80	·0916	
150	8·63	·22	·37	75	·1304	
200	·42	·15	·34	79	·1689	
300	7·86	·17	·46	69	·2429	
[380]				65	·2965	60·1935
400	6·86	·08	·52	64	·3094	
[450]				40	·3354	82·3525
500	0·81	34·88	·98	15		
550	·22	·85	28·00	13		

SE. 5. 63°06′N 6°35′W 22.7.49
1371 m. 0255-0430

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	11·00	35·16	26·92	115		
10	·00	·18	·93	114	·0114	
20	10·73	·16	·97	110	·0226	
30	9·26	·15	27·21	88	·0325	
50	8·24	·14	·36	74	·0487	
75	·08	·14	·39	71	·0668	
100	·76	·15	·29	82	·0859	
150	7·94	·14	·41	71	·1241	
200	8·22	·13	·36	77	·1611	
300	·18	·19	·41	74	·2366	
400	·36	·17	·37	80	·3136	
[450]				51	·3464	80·9421
500	0·85	34·79	·91	22		

SSE. 5. 63°18½′N 60°35′W 22.7.49
1500 m. 0555-0705

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	11·20	35·19	26·91	116		
10	·20	·18	·90	117	·0116	
20	·18	·19	·90	117	·0233	
30	10·38	·15	27·02	106	·0345	
50	9·08	·13	·23	86	·0537	
75	8·15	·17	·40	71	·0733	
100	9·07	·16	·25	85	·0928	
150	8·96	·15	·27	84	·1350	
200	·70	·11	·27	85	·1772	
[295]				52	·2423	38·4934
300	6·11	·11	·65	50	·2447	
400	8·05	·16	·41	75	·3072	
[450]				47	·3377	83·3797
500	0·52	34·81	·94	18		

SSE. 4. 63°30′N 6°35′W 22.7.49
1520 m. 0820-1030

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·84	35·20	26·98	109		
10	·83	·20	·98	109	·0109	
20	·82	·20	·98	109	·0218	
30	9·45	34·96	27·03	105	·0325	
50	7·82	35·08	·39	71	·0501	
75	·68	·17	·48	63	·0669	
100	8·97	·08	·20	90	·0860	
150	6·57	·07	·55	57	·1228	
200	4·48	34·97	·66	47	·1488	
[295]				24	·1825	32·4360
300	1·66	·84	·90	23		

VOLUME TRANSPORT

		Km³/hr.
62°33′N 6°35′W.	ΔQ=·1267×155−10·0845= 9·5540	+0·14
62°43′N 6°35′W.	ΔQ=·1248×155−10·3113= 9·0327	
”	ΔQ=·2874×380−57·2545=51·9575	−0·14
62°55′N 6°35′W.	ΔQ=·2965×380−60·1935=52·4765	
”	ΔQ=·3354×450−82·3525=68·5775	−1·76
63°06′N 6°35′W.	ΔQ=·3464×450−80·9421=74·9379	
63°18½′N 6°35′W.	ΔQ=·3377×450−83·3797=68·5853	+1·76
”	ΔQ=·2423×295−38·4934=32·9851	+3·20
63°30′N 6°35′W.	ΔQ=·1825×295−32·4360=21·4015	
		+3·20

MUNKEN ROCK, FAROE—HOY, ORKNEY

F.R.S. *SCOTIA*

30-31 July, 1949

NW. 1. 61°18½N 6°35′W 30.7.49
91 m. 0457-0520

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	9·50	35·17	27·19	89		
10	·41	·17	·20	88	·0088	
20	·32	·16	·21	88	·0176	
30	·31	·17	·22	87	·0264	
50	·14	·16	·24	85	·0436	
85	8·87	·17	·29	81	·0726	
[100]				80	·0847	
[125]				78	·1045	6·6743

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
E. 2.			61°05′N 6°30′W			30.7.49
			163 m.			0845-0925
0	9·27	35·18	27·23	85		
10	·26	·19	·24	84	·0084	
20	·11	·18	·26	83	·0168	
30	8·91	·17	·28	81	·0250	
50	·70	·18	·33	77	·0408	
75	·58	·20	·36	74	·0597	
100	·56	·19	·35	76	·0785	
125	·58	·18	·34	77	·0976	6·2199
155	·56	·18	·35	77	·1207	9·4944
NE. 1.			60°46′N 6°12′W			30.7.49
			150 m.			1410-1510
0	11·52	35·18	26·84	122		
10	·09	·18	·92	115	·0118	
20	10·49	·19	27·03	105	·0228	
30	·28	·20	·08	100	·0330	
50	8·76	·19	·32	78	·0508	
75	7·84	·21	·49	62	·0683	
100	·56	·19	·52	59	·0834	
125	·56	·22	·54	58	·0980	
145	·39	·20	·54	58	·1096	
[155]				60	·1155	10·2030
[200]				58	·1421	
[305]				52	·1999	33·9540
S. 2.			60°20′N 5°50′W			30.7.49
			558 m.			1750-1915
0	12·06	35·22	26·76	130		
10	11·90	·23	·80	126	·0128	
20	·62	·20	·83	124	·0253	
30	·33	·22	·90	117	·0373	
50	9·97	·20	27·13	96	·0586	
75	8·80	·20	·32	78	·0804	
100	·39	·20	·39	72	·0992	
150	·47	·20	·38	74	·1357	
200	7·74	·19	·49	64	·1702	
300	·27	·16	·53	62	·2332	
[305]				61	·2363	40·3728
400	6·03	·11	·66	50	·2923	
[500]				24	·3293	
[540]				14	·3369	109·8780
550	0·15	34·87	28·02	11		
SE. 6.			60°00′N 5°25′W			30.7.49
			604 m.			2220-2400
0	14·22	35·35	26·43	161		
10	·16	·36	·45	159	·0160	
20	13·82	·37	·53	152	·0316	
30	12·45	·35	·79	128	·0456	
50	11·01	·34	27·06	103	·0687	
75	10·04	·33	·22	88	·0926	
100	9·97	·40	·29	82	·1138	
200	9·73	·37	·30	83	·1963	
300	·02	·27	·34	81	·2783	
[370]				77	·3336	67·0947
400	8·31	·23	·42	75	·3563	
500	7·19	·19	·57	61	·4243	
[540]				54	·4473	133·8702
550	6·14	·14	·67	52		
SE. 4.			59°40′N 5°00W			31.7.49
			137 m.			0510-0550
0	14·07	53·33	26·45	159		
10	·05	·36	·47	158	·0158	
20	13·76	·36	·53	152	·0313	
30	12·36	·36	·81	126	·0452	
50	10·85	·36	27·10	99	·0677	
75	·50	·36	·16	94	·0918	
100	·05	·33	·22	88	·1146	
[120]				87	·1321	8·8668
132	9·98	·35	·25	86		
[200]				84	·2006	
[300]				82	·2836	
[370]				81	·3406	68·2168

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
S. 3-4.			59°21′N 4°35′W			31.7.49
			101 m.			0915-1015
0	14·41	35·30	26·35	169		
10	·41	·35	·39	165	·0167	
20	·35	·32	·38	166	·0333	
30	11·55	·20	·85	122	·0477	
50	10·15	·20	27·10	99	·0698	
75	·01	·30	·20	90	·0934	
95	·01	·30	·20	90	·1114	6·0015
[120]				87	·1335	9·0627
S. 2.			59°02′N 4°04′W			31.7.49
			91 m.			1545-1645
0	14·23	35·08	26·22	181		
10	·06	·09	·26	178	·0180	
20	13·81	·09	·31	173	·0356	
30	11·72	·07	·71	135	·0510	
50	10·61	·08	·93	115	·0760	
75	·19	·20	27·10	99	·1028	
88	·16	·24	·13	97	·1155	
[95]				96	·1223	6·5473

VOLUME TRANSPORT

			Km³/hr.
61°18½′N 6°35′W.	ΔQ=·1045×125− 6·6743=	6·3882	+ 0·12
61°05′N 6°30′W.	ΔQ=·0976×125− 6·2199=	5·9801	
”	ΔQ=·1207×155− 9·4944=	9·2141	+ 0·43
60°46′N 6°12′W.	ΔQ=·1155×155− 10·2030=	7·6995	
”	ΔQ=·1999×305− 33·9540=	27·0155	− 1·33
60°20′N 5°50′W.	ΔQ=·2363×305− 40·3728=	31·6987	
”	ΔQ=·3369×540−109·8780=	72·0480	−10·14
60°00′N 5°25′W.	ΔQ=·4473×540−133·8702=	107·6718	
”	ΔQ=·3336×370− 67·0947=	56·3373	− 0·42
59°40′N 5°00′W.	ΔQ=·3406×370− 68·2168=	57·8052	
”	ΔQ=·1321×120− 8·8668=	6·9852	+ 0·01
59°21′N 4°35′W·	ΔQ=·1335×120− 9·0627=	6·9573	
”	ΔQ=·1114× 95− 6·0015=	4·5815	− 0·14
59°02′N 4°04′W.	ΔQ=·1223× 95− 6·5473=	5·0712	
			−11·47

LATITUDE 62°02′N, LONGITUDE 9°18′W —FAROE BANK—BUTT OF LEWIS

F.R.S. *SCOTIA*

3-5 September, 1949

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
S. 3-4.			62°02′N 9°18′W			4/5.9.49
			555 m.			2300-0050
0	11·99	35·19	26·76	130		
10	·93	·17	·75	131	·0130	
20	·89	·17	·76	130	·0260	
30	·73	·16	·78	129	·0390	
40	·71	·16	·78	129	·0519	
50	·85	·16	·76	131	·0649	
75	·30	·16	·86	122	·0965	
100	10·58	·16	·99	110	·1255	
125	9·10	9·19	27·27	84	·1497	
150	8·77	·19	·32	80	·1702	
200	·55	·16	·33	79	·2100	
250	·40	·19	·38	76	·2488	
300	·28	·19	·40	75	·2866	
400	·07	·19	·43	74	·3611	
500	7·89	·16	·43	75	·4356	
[600]				74	·5101	
[650]				70	·5461	194·1248

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
S. 3-4.			61°48′N 9°06′W			4.9.49
			860 m.			2000-2150
0	12·18	35·08	26·63	142		
10	·18	·10	·65	141	·0142	
20	·18	·14	·68	138	·0282	
30	·05	·09	·67	139	·0420	
50	11·69	·09	·73	134	·0693	
75	10·53	·16	27·01	108	·0995	
100	·22	·16	·06	104	·1260	
125	9·49	·18	·20	91	·1504	
150	·32	·17	·22	89	·1729	
200	8·85	·17	·29	83	·2159	
250	·73	·17	·31	83	·2574	
300	·57	·17	·34	81	·2984	
400	·42	·18	·37	80	·3789	
500	·13	·16	·40	78	·4579	
600	7·43	·12	·47	73	·5334	
[650]				42	·5622	202·2435
[690]				16	·5738	224·9635
700	0·28	34·90	28·03	10		
S. 3.			61°35′N 8°53′W			4.9.49
			659 m.			1735-1825
0	12·39	35·19	26·68	137		
10	·39	·17	·66	140	·0138	
20	·34	·17	·67	139	·0278	
30	·30	·12	·64	142	·0418	
40	·08	·12	·68	138	·0558	
50	11·15	·15	·88	120	·0687	
75	9·66	·16	27·15	94	·0955	
100	·01	·16	·26	84	·1177	
125	8·76	·16	·30	81	·1383	
150	·65	·17	·33	79	·1583	
200	·55	·16	·33	79	·1978	
250	·38	·15	·35	79	·2373	
300	·27	·14	·36	79	2768	
400	·10	·17	·41	76	·3543	
[480]				75	·4147	108·3480
500	·00	·17	·43	75	·4298	
600	7·82	·17	·45	75	·5048	
650	·65	·15	·45	76	·5426	
[690]				62	·5702	211·9240
S. 2.			61°21½′N 8°32′W			4.9.49
			298 m.			1500-1604
0	12·32	35·20	26·70	135		
10	·28	·17	·68	138	·0136	
20	·21	·17	·70	136	·0273	
30	·10	·17	·72	134	·0408	
50	10·00	·20	27·12	97	·0639	
75	9·12	·28	·34	76	·0855	
100	·01	·26	·34	77	·1046	
125	8·82	·26	·37	74	·1235	
150	·76	·21	·34	78	·1425	
200	·66	·21	·35	78	·1815	20·1799
250	·36	·21	·40	74	·2195	
290	·27	·21	·41	74	·2491	
[400]				76	·3316	
[480]				75	·3920	100·4594
SSW. 1.			61°08′N 8°29′W			4.9.49
			97 m.			1240-1330
0	11·29	35·17	26·87	119		
10	·14	·17	·90	117	·0118	
20	·01	·17	·92	115	·0234	
30	10·95	·23	·98	110	·0346	
40	·85	·21	·98	110	·0456	
50	·58	·25	27·06	102	·0562	
75	·52	·26	·08	101	·0816	
95	·53	·23	·05	104	·1021	
[135]				89	·1407	9·8505
[200]				80	·1956	20·7803
SSE. 3-4.			60°54′N 8°16′W			4.9.49
			176 m.			0815-0940
0	11·31	35·18	26·87	119		
10	·22	·18	·89	118	·0118	
20	·03	·24	·98	109	·0232	
30	10·97	·31	27·04	104	·0338	
50	·65	·18	·00	108	·0550	
75	·35	·18	·05	104	·0815	
100	·05	·19	·11	99	·1069	
125	9·84	·21	·16	94	·1310	
[135]				89	·1402	9·7980
150	·43	·31	·31	81	·1529	
175	·22	·26	·30	82	·1733	
[200]				80	·1935	
[250]				78	·2330	
[300]				77	·2718	
[400]				72	·3463	
[500]				45	·4048	
[550]				29	·4233	133·0983
ESE. 1.			60°45′N 8°08′W			4.9.49
			695 m.			0615-0715
0	11·33	35·18	26·88	118		
10	·32	·18	·88	119	·0118	
20	·25	·17	·88	119	·0237	
30	·19	·18	·90	117	·0355	
40	10·70	·19	27·00	108	·0467	
50	·30	·17	·05	103	·0573	
75	9·84	·20	·15	94	·0819	
100	·42	·25	·26	84	·1042	
125	·18	·25	·30	81	·1248	
150	·08	·23	·30	82	·1452	
200	8·94	·26	·35	78	·1852	
250	·80	·26	·37	77	·2240	
300	·60	·22	·37	78	·2628	
400	7·77	·17	·46	71	·3373	
500	5·17	·05	·72	45	·3953	
[550]				33	·4148	129·3127
650	–0·49	34·84	28·02	9		

VOLUME TRANSPORT

		Km³/hr.
62°02′N 9°18′W.	ΔQ=·5641×650−194·1248=160·8402	−0·66
61°48′N 9°06′W.	ΔQ=·5622×650−202·2435=163·1865	
”	ΔQ=·5738×690−224·9635=170·9585	−2·96
61°35′N 8°53′W.	ΔQ=·5702×690−211·9240=181·5140	
”	ΔQ=·4147×480−108·3480= 90·7080	+0·85
61°21½′N 8°32′W.	ΔQ=·3920×480−100·4594= 87·7006	
”	ΔQ=·1815×200− 20·1799= 16·1201	−0·63
61°08′N 8°29′W.	ΔQ=·1956×200− 20·7803= 18·3397	
”	ΔQ=·1407×135− 9·8505= 9·1440	+0
60°54′N 8°16′W.	ΔQ=·1402×135− 9·7980= 9·1290	
		−3·40

S. 2. 60°35′N 8°00′W 4.9.49
878 m. 0345-0510

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·45	35·22	26·88	118		
10	·45	·19	·86	121	·0120	
20	·28	·19	·89	118	·0240	
30	·11	·19	·92	115	·0356	
50	10·62	·20	27·02	106	·0577	
75	9·66	·20	·18	92	·0825	
100	·31	·20	·24	86	·1048	
125	·13	·21	·28	83	·1259	
150	·05	·21	·30	82	·1465	
200	8·85	·21	·32	81	·1873	
250	·50	·16	·34	80	·2275	
300	·08	·12	·37	77	·2667	
400	6·56	·11	·59	57	·3337	
500	4·71	34·95	·69	47	·3857	
[550]				29	·4047	128·6735
600	–0·25	·85	28·02	10		
700	·69	·84	·03	8		
800	·71	·84	·03	8		

S/W. 2. 60°23½′N 7°49½′W 4.9.49
805 m. 0135-0225

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·70	35·14	26·77	129		
10	·66	·30	·90	117	·0123	
20	·60	·20	·84	123	·0243	
30	·41	·19	·86	121	·0365	
40	·29	·19	·89	118	·0485	
50	·08	·18	·92	116	·0602	
75	10·56	·18	27·01	108	·0882	
100	9·83	·24	·20	90	·1130	
125	·29	·28	·31	80	·1343	
150	·05	·20	·28	84	·1548	
200	8·82	·19	·31	82	·1963	
250	·79	·18	·31	83	·2375	
300	·60	·19	·35	80	·2783	
400	7·34	·16	·52	65	·3508	
500	5·03	34·99	·68	49	·4078	
[550]					·4228	135·2595
600	–0·38	·83	28·01	11		

Var. 1. 60°12′N 7°40′W 3/4.9.49
622 m. 2250-0020

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	12·51	35·21	26·67	138		
10	·00	·20	·76	130	·0314	
20	11·01	·21	·95	112	·0255	
30	10·68	·21	27·01	107	·0365	
50	·50	·21	·05	103	·0575	
75	9·88	·21	·15	94	·0821	
100	·53	·24	·24	86	·1046	
125	·21	·25	·30	81	·1255	
150	·15	·19	·26	85	·1463	
200	·08	·20	·28	84	·1886	
250	8·94	·21	·31	83	·2304	
300	·78	·19	·32	83	·2719	
400	·70	·19	·33	84	·3554	
500	·52	·19	·36	83	·4389	
550	·49	·19	·37	83	·4804	137·3315

SSW. 3. 59°56·N 7°27′W 3.9.49
613 m. 1945-2110

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	12·74	35·22	26·63	142		
10	·52	·23	·68	138	·0140	
20	·13	·22	·75	131	·0274	
30	11·39	·23	·90	117	·0398	
40	·30	·25	·93	115	·0514	
50	·10	·26	·98	110	·0626	
75	9·95	·34	27·25	85	·0870	
100	·72	·26	·22	88	·1086	
125	·36	·26	·28	83	·1300	
150	·27	·26	·30	82	·1506	
200	·12	·25	·31	82	·1916	
250	·02	·28	·36	78	·2316	
300	8·95	·26	·35	80	·2711	
400	·80	·22	·34	83	·3526	
500	·61	·22	·37	82	·4351	
[550]				79	·4753	137·4765
600	·19	·22	·44	76		

SSW. 1. 59°44′N 7°15′W 3.9.49
992 m. 1730-1830

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	13·02	35·22	26·58	147		
10	12·71	·23	·65	141	·0144	
20	·62	·23	·67	139	·0284	
30	·36	·22	·71	135	·0421	
50	11·26	·23	·92	116	·0672	
75	10·33	·23	27·09	100	·0942	
100	9·93	·30	·22	88	·1177	
125	·52	·30	·29	82	·1389	
150	·95	·30	·21	90	·1604	
200	·15	·28	·33	80	·2029	
250	·79	·26	·21	93	·2461	
300	·67	·26	·23	92	·2923	
400	·22	·25	·30	87	·3818	
500	8·75	·25	·37	82	·4663	
[550]				83	·5075	147·5690
600	·55	·21	·37	84		

SW. 2. 59°31′N 7°05′W 3.9.49
1033 m. 1345-1555

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	13·71	35·19	26·41	163		
10	·50	·19	·45	159	·0161	
20	·27	·28	·57	148	·0315	
30	12·36	·28	·75	132	·0455	
40	·19	·28	·79	128	·0585	
50	11·59	·30	·92	116	·0707	
75	10·23	·30	27·16	94	·0969	
100	9·77	·29	·24	87	·1195	
125	·70	·30	·26	85	·1410	
150	·58	·30	·28	84	·1621	
200	·36	·30	·31	82	·2036	
250	·23	·30	·33	81	·2444	
300	·15	·30	·35	80	·2846	
400	8·98	·27	·35	82	·3656	
500	·81	·24	·35	84	·4486	
[550]				84	·4906	143·9820
600	·64	·22	·37	84		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
SW. 2-3.			59°17′N 6°53′W			3.9.49
			567 m.			1120-1210
0	13·70	35·18	26·40	164		
10	·62	·17	·41	163	·0164	
20	·64	·21	·45	160	·0326	
30	·58	·18	·43	162	·0487	
50	12·18	·24	·76	131	·0780	
75	10·66	·26	27·06	103	·1072	
100	·33	·28	·13	97	·1322	
125	·10	·27	·16	95	·1562	
150	·23	·28	·15	96	·1801	
200	9·76	·27	·22	90	·2266	
250	·71	·26	·22	92	·2721	
300	·51	·26	·25	90	·3176	
[360]				89	·3713	73·1613
400	·27	·25	·29	88	·4071	
550	·12	·24	·31	89	·5399	159·7543
SSW. 2.			59°00′N 6°40′W			3.9.49
			148 m.			0820-0920
0	13·69	35·18	26·41	163		
10	·62	·19	·43	161	·0162	
20	·60	·17	·42	163	·0324	
30	·51	·18	·45	160	·0486	
40	·00	·24	·60	146	·0639	
50	12·33	·20	·70	137	·0781	
75	10·67	·17	·99	110	·1090	
100	·39	·20	27·06	104	·1358	
[135]				101	·1717	12·7815
145	·31	·25	·11	100		
[200]				98	·2368	
[300]				95	·3333	
[360]				94	·3900	76·2343
SW. 1.			58°50′N 6°26′W			3.9.49
			119 m.			0350-0525
0	13·73	35·08	26·32	172		
10	·72	·10	·34	170	·0171	
20	·37	·08	·40	164	·0338	
30	·01	·00	·41	164	·0502	
40	12·72	·09	·54	152	·0660	
50	·61	·18	·63	143	·0808	
75	11·02	·17	·92	116	·1132	
100	10·88	·17	·96	113	·1418	
115	·58	·18	27·01	109		
[120]				109	·1640	10·7455
[135]				105	·1800	13·3190
SE. 4-5.			58°40′N 6°10′W			3.9.49
			121 m.			0150-0250
0	13·76	34·98	26·24	179		
10	·75	35·07	·31	173	·0176	
20	·57	·08	·36	168	·0346	
30	12·77	34·86	·35	169	·0514	
40	·89	35·00	·43	162	·0680	
50	·91	·07	·48	158	·0840	
75	·67	·11	·56	151	·1226	
100	11·79	·08	·71	137	·1586	
115	·41	·08	·77	132		
[120]				130	·1853	11·6475

Volume Transport

		Km³/hr.
60°54′N 8°16′W.	$\triangle Q = {\cdot}4233 \times 550 - 133{\cdot}0983 \doteq 99{\cdot}7167$	+ 0·25
60°45′N 8°08′W.	$\triangle Q = {\cdot}4148 \times 550 - 129{\cdot}3127 = 98{\cdot}8273$	+ 1·39
60°35′N 8°00′W.	$\triangle Q = {\cdot}4047 \times 550 - 128{\cdot}6735 = 93{\cdot}9115$	− 0·96
60°23½′N 7°49½′W.	$\triangle Q = {\cdot}4228 \times 550 - 135{\cdot}2595 = 97{\cdot}2805$	− 8·41
60°12′N 7°40′W.	$\triangle Q = {\cdot}4804 \times 550 - 137{\cdot}3315 = 126{\cdot}8885$	+ 0·84
59°56′N 7°27′W.	$\triangle Q = {\cdot}4753 \times 550 - 137{\cdot}4765 = 123{\cdot}9385$	− 2·17
59°44′N 7°15′W.	$\triangle Q = {\cdot}5075 \times 550 - 147{\cdot}5690 = 131{\cdot}5560$	+ 1·63
59°31′N 7°05′W.	$\triangle Q = {\cdot}4906 \times 550 - 143{\cdot}9820 = 125{\cdot}8480$	− 3·25
59°17′N 6°53′W.	$\triangle Q = {\cdot}5399 \times 550 - 159{\cdot}7543 = 137{\cdot}1907$	
”	$\triangle Q = {\cdot}3713 \times 360 - 73{\cdot}1613 = 60{\cdot}5067$	− 1·05
59°00′N 6°40′W.	$\triangle Q = {\cdot}3900 \times 360 - 76{\cdot}2343 = 64{\cdot}1657$	
”	$\triangle Q = {\cdot}1717 \times 135 - 12{\cdot}7815 = 10{\cdot}3980$	− 0·17
58°50′N 6°26′W.	$\triangle Q = {\cdot}1800 \times 135 - 13{\cdot}3190 = 10{\cdot}9810$	
”	$\triangle Q = {\cdot}1640 \times 120 - 10{\cdot}7455 = 8{\cdot}9345$	− 0·48
58°40′N 6°10′W.	$\triangle Q = {\cdot}1853 \times 120 - 11{\cdot}6475 = 10{\cdot}5885$	
		−12·38

NOLSØ, FAROE—FLUGGA, SHETLAND

F.R.S. *SCOTIA*

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m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
W. 4.			62°00′N 6°12′W			12.9.49
			132 m.			1350-1425
0	10·02	35·08	27·03	104		
10	·01	·08	·03	104	·0104	
20	·01	·08	·03	105	·0208	
30	·00	·09	·04	104	·0312	
40	9·99	·08	·03	105	·0416	
50	10·00	·08	·03	105	·0521	
75	·00	·09	·04	105	·0783	
100	9·99	·08	·03	106	·1047	
130	·97	·09	·05	105	·1363	
[190]				87	·1939	18·7390
WSW. 3			61°54′N 5°45′W			12.9.49
			251 m.			1540-1650
0	10·49	35·12	26·98	109		
10	·48	·17	27·02	105	·0107	
20	·45	·16	·01	107	·0213	
30	·44	·12	26·98	110	·0321	
50	·32	·17	27·05	103	·0534	
75	9·95	·18	·12	97	·0785	
100	·20	·17	·24	86	·1014	
150	8·25	·18	·39	73	·1412	
[190]				73	·1704	17·5301
200	·15	·17	·40	73	·1777	
[205]				73	·1813	20·1681
250	·10	·17	·41	73		
SW. 4.			61°49′N 5°21′W			12.9.49
			161 m.			1755-1830
0	10·80	35·12	26·92	115		
10	·79	·17	·96	111	·0113	
20	9·53	·19	27·20	88	·0213	
30	·00	·19	·29	80	·0297	
40	8·65	·18	·33	77	·0375	
50	·30	·18	·38	72	·0449	
75	·15	·17	·40	71	·0627	
100	·14	·17	·40	71	·0805	
150	·14	·18	·41	71	·1160	
[200]				71	·1515	15·9575
[205]				71	·1551	16·7240

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SW. 3.			61°42′N 4°51′W			12.9.49
			234 m.			2010-2140
0	10·65	35·15	26·97	110		
10	·65	·16	·98	109	·0110	
20	·61	·16	·99	108	·0218	
30	·10	·17	27·08	100	·0322	
50	9·21	·18	·24	85	·0507	
75	8·73	·16	·30	80	·0713	
100	·51	·17	·34	77	·0909	
150	·25	·17	·39	73	·1284	
200	·05	·17	·42	71	·1644	17·6730
230	·54	·17	·34	79		
[300]				40	·2199	
[320]				35	·2274	41·3610
WSW. 3.			61°35′N 4°15′W			12/13.9.49
			778 m.			2315-0110
0	10·92	35·15	26·92	115		
10	·94	·15	·92	115	·0115	
20	·92	·17	·94	113	·0229	
30	·78	·16	·96	112	·0341	
40	9·90	·18	27·13	96	·0445	
50	·26	·19	·24	85	·0535	
75	8·71	·19	·33	77	·0737	
100	·36	·19	·38	73	·0925	
150	7·85	·17	·46	66	·1273	
200	8·03	·20	·44	69	·1611	
300	6·21	·10	·62	53	·2221	32·6580
[320]				49	·2323	41·4740
400	2·81	34·87	·82	32		
SW. 1.			61°28′N 3°42′W			13.9.49
			1170 m.			0245-0405
0	11·47	35·10	26·78	128		
10	·47	·11	·79	127	·0128	
20	·47	·11	·79	127	·0255	
30	·19	·08	·82	125	·0381	
50	10·71	·08	·91	117	·0623	
75	8·24	·07	27·31	79	·0868	
100	7·77	·11	·42	69	·1053	
150	·37	·11	·48	64	·1385	
200	6·97	·10	·53	60	·1695	
300	3·66	34·92	·78	36	·2175	38·9875
[325]				32	·2260	44·5313
400	1·00	·83	·93	20		
W. 2.			61°21′N 3°10′W			13.9.49
			1262 m.			0600-0725
0	11·15	35·18	26·91	116		
10	·15	·16	·89	118	·0117	
20	·15	·10	·84	123	·0237	
30	·13	·11	·85	122	·0359	
40	9·17	·13	27·21	88	·0464	
50	8·54	·15	·32	78	·0547	
75	·33	·15	·35	75	·0738	
100	·16	·14	·38	73	·0923	
200	7·84	·12	·41	72	·1648	
250	·59	·14	·47	67	·1996	
300	·31	·14	·51	64	·2324	
[325]				61	·2480	43·9029
[360]				56	·2684	52·9219
400	5·26	34·98	·65	51		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SSW. 1.			61°14′N 2°40′W			13.9.49
			1116 m.			0900-0950
0	11·63	35·17	26·81	125		
10	·63	·17	·81	125	·0125	
20	·55	·17	·82	125	·0250	
30	·54	·16	·82	125	·0375	
50	9·73	·17	27·15	94	·0594	
75	·35	·25	·27	83	·0815	
100	8·74	·25	·37	74	·1011	
150	·21	·25	·45	67	·1363	
200	7·81	·23	·50	63	·1688	
300	5·62	·07	·68	47	·2238	
[360]				32	·2475	52·9067
400	1·72	34·87	·92	22	·2583	
[465]				15	·2703	80·0522
500	0·37	·88	28·02	11		
SSE. 1.			61°08′N 2°10′W			13.9.49
			640 m.			1130-1245
0	11·87	35·17	26·77	129		
10	·71	·16	·79	127	·0128	
20	·68	·15	·78	128	·0256	
30	·61	·16	·80	127	·0384	
40	·24	·19	·90	117	·0506	
50	10·50	·22	27·05	103	·0616	
75	9·53	·23	·23	87	·0854	
100	·01	·24	·32	79	·1062	
150	8·54	·24	·40	72	·1440	
200	·12	·23	·46	67	·1788	
300	7·58	·15	·48	67	·2458	
400	6·14	·11	·64	52	·3053	
[465]				36	·3339	89·6985
[470]				35	·3357	91·3595
500	2·20	34·85	·86	28		
600	–0·85	·83	28·03	8		
E. 1-2.			61°01′N 1°36′W			13.9.49
			150 m.			1645-1740
0	12·83	35·26	26·64	141		
10	·66	·28	·70	136	·0138	
20	·63	·26	·68	138	·0275	
30	·61	·35	·76	131	·0409	
50	11·70	·34	·93	115	·0654	
75	10·14	·33	27·20	90	·0910	
100	·03	·32	·21	89	·1134	
[130]				89	·1401	9·9930
145	·00	·32	·22	89	·1534	
[200]				87	·2018	
[300]				81	·2858	
[400]				73	·3628	
[470]				65	·4111	105·8580
E. 3.			60°56′N 1°00′W			13.9.49
			113 m.			2045-2125
0	12·62	35·21	26·65	140		
10	·52	·21	·67	139	·0140	
20	·49	·21	·67	139	·0279	
30	·46	·23	·70	136	·0417	
40	·20	·24	·75	132	·0551	
50	11·10	·24	·96	112	·0675	
75	10·82	·25	27·02	107	·0949	
100	·11	·26	·15	95	·1303	
[130]				92	·1490	10·4885

VOLUME TRANSPORT

		Km³/hr
62°00′N 6°12′W.	ΔQ=·1939×190− 18·7390=18·1020	+0·91
61°54′N 5°45′W.	ΔQ=·1704×190− 17·5301=14·8459	
”	ΔQ=·1813×205− 20·1681=16·9984	+0·54
61°49′N 5°21′W.	ΔQ=·1551×205− 16·7240=15·0715	
”	ΔQ=·1515×200− 15·9575=14·3425	−0·24
61°42′N 4°51′W.	ΔQ=·1644×200− 17·6730=15·2070	
”	ΔQ=·2274×320− 41·3610=31·4070	−0·41
61°35′N 4°15′W.	ΔQ=·2323×320− 41·4740=32·8620	
”	ΔQ=·2221×300− 36·9300=29·7000	+0·96
61°28′N 3°42′W.	ΔQ=·2175×300− 38·9875=26·2625	
”	ΔQ=·2260×325− 44·5313=28·9187	−2·19
61°21′N 3°10′W.	ΔQ=·2480×325− 43·9029=36·6971	
”	ΔQ=·2684×360− 52·9219=43·7021	+2·11
61°14′N 2°40′W.	ΔQ=·2475×360− 52·9067=36·1933	
”	ΔQ=·2703×465− 80·0522=45·6373	−5·62
61°08′N 2°10′W.	ΔQ=·3339×465− 89·6985=65·5650	
”	ΔQ=·3357×470− 91·3595=66·4195	−5·91
61°01′N 1°36′W.	ΔQ=·4111×470−105·8580=87·3590	
”	ΔQ=·1401×130− 9·9930= 8·2200	−0·19
60°56′N 1°00′W.	ΔQ=·1490×130− 10·4885= 8·8815	
		−10·04

FAROE BANK—BUTT OF LEWIS

F.R.S. *SCOTIA*

11-12 November, 1949

NNE. 5-6. 60°54′N 8°16′W 12.11.49
179 m. 2300-2342

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	9·52	35·17	27·18	90		
10	·57	·31	·28	81	·0086	
20	·57	·19	·19	89	·0171	
30	·57	·24	·23	86	·0259	
50	·53	·18	·19	90	·0435	
75	·48	·19	·21	89	·0659	
100	·29	·19	·24	86	·0878	
125	·43	·19	·21	90	·1098	
150	·17	·20	·26	85	·1317	
170	·23	·29	·32	80	·1482	
[200]				78	·1719	
[300]				71	·2464	
[400]				61	·3124	
[500]				47	·3664	
[550]				43	·3889	119·1360

N. 3. 60°45′N 8°08′W 12.11.49
932 m. 1750-1845

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	9·36	35·19	27·23	85		
10	·40	·19	·22	86	·0086	
20	·39	·23	·25	84	·0171	
30	·39	·20	·23	86	·0256	
50	·39	·20	·23	86	·0428	
75	·40	·17	·20	90	·0648	
100	·28	·17	·22	88	·0870	
150	·23	·22	·27	85	·1302	
200	8·95	·22	·32	81	·1717	
[300]	·47	·19	·37	78	·2512	
400	7·69	·13	·46	71	·3257	
[500]	5·61	·06	·68	49	·3857	
[550]	4·90	·04	·74	44	·4089	122·7140
600	·48	·02	·77	41		

NNE. 3. 60°35′N 8°00′W 12.11.49
978 m. 1555-1650

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	9·36	35·23	27·26	82		
10	·39	·22	·25	84	·0083	
20	·39	·21	·24	85	·0167	
30	·40	·21	·24	85	·0252	
50	·40	·24	·26	83	·0420	
75	·41	·23	·25	85	·0630	
100	·41	·21	·23	87	·0845	
150	8·67	·23	·37	75	·1250	
200	·26	·23	·43	70	·1612	
[300]	7·30	·16	·53	62	·2272	
400	6·28	·16	·67	50	·2832	
[500]	5·57	·14	·74	44	·3302	
[550]	·22	·11	·76	42	·3517	109·2543
600	4·68	·07	·79	39		

NNE. 3. 60°23½′N 7°49½′W 12.11.49
825 m. 1255-1430

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	9·41	35·23	27·25	83		
10	·41	·22	·24	84	·0084	
20	·42	·22	·24	85	·0168	
30	·43	·23	·24	85	·0253	
50	·42	·23	·24	85	·0423	
75	·42	·22	·24	86	·0637	
100	·42	·23	·24	86	·0852	
150	·46	·24	·25	87	·1284	
200	8·51	·24	·40	73	·1684	
[300]	7·94	·23	·48	67	·2384	
400	6·99	·14	·56	60	·3019	
[500]	4·14	34·99	·79	37	·3504	
[550]	2·60	·95	·91	25	·3659	114·8782
600	1·20	·93	28·00	14		

NNE. 3. 60°12′N 7°40′W 12.11.49
677 m. 0955-1045

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·18	35·25	27·13	95		
10	·19	·26	·14	94	·0094	
20	·19	·25	·13	95	·0188	
30	·19	·24	·12	96	·0284	
50	·19	·24	·12	97	·0477	
75	·20	·24	·12	97	·0719	
100	·20	·24	·12	98	·0963	
150	9·92	·25	·18	93	·1441	
200	·49	·29	·28	85	·1886	
300	·16	·34	·38	77	·2696	
400	8·97	·31	·39	78	·3471	
[500]	·78	·29	·40	79	·4256	
[550]	·68	·29	·42	78	·4648	133·7500
600	·58	·28	·43	78		

NNE. 3-4. 59°56′N 7°27′W 12.11.49
723 m. 0715-0815

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·23	35·30	27·16	92		
10	·24	·30	·16	92	·0092	
20	·25	·28	·14	94	·0185	
30	·25	·25	·12	96	·0280	
50	·25	·26	·13	96	·0472	
75	·24	·25	·12	97	·0713	
100	·19	·25	·13	97	·0955	
150	9·93	·26	·18	93	·1430	
200	·65	·28	·25	88	·1882	
300	·35	·28	·30	85	·2747	
400	·08	·27	·34	83	·3587	
[500]	8.89	·26	·36	83	·4417	
[550]	·81	·26	·37	83	·4832	136·9352
600	·77	·26	·38	83		

NNE. 3-4. 59°44′N 7°15′W 12.11.49
969 m. 0445-0545

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·23	35·26	27·13	95		
10	·25	·26	·13	95	·0095	
20	·26	·27	·13	95	·0190	
30	·27	·27	·13	95	·0285	
50	·28	·28	·14	95	·0475	
75	·29	·26	·12	97	·0715	
100	·24	·26	·13	97	·0957	
150	·35	·30	·14	97	·1442	
200	9·53	·30	·28	85	·1897	
300	·32	·30	·32	83	·2737	
400	·00	·30	·37	80	·3552	
[500]	8·91	·27	·36	83	·4367	
[550]	·89	·26	·36	84	·4785	136·2000
600	·85	·26	·36	85		

NNE. 4. 59°31′N 7°05′W 12.11.49
1024 m. 0155-0320

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·90	35·29	27·04	103		
10	·92	·30	·04	103	·0103	
20	·92	·30	·04	104	·0207	
30	·90	·29	·04	104	·0311	
50	·89	·28	·03	105	·0520	
75	·80	·30	·06	103	·0780	
100	·65	·29	·08	102	·1036	
150	·05	·34	·23	89	·1514	
200	9·82	·34	·26	87	·1954	
300	·36	·34	·34	81	·2794	
400	·14	·33	·37	80	·3599	
[500]	8·96	·31	·38	81	·4404	
[550]	·88	·30	·39	81	·4809	138·9890
600	·80	·29	·39	82		

ENE. 4-5. 59°17′N 6°53′W 11/12.12.49
640 m. 2330-0010

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	11·09	35·23	26·95	112		
10	·12	·27	·98	109	·0110	
20	·08	·26	·98	109	·0219	
30	·02	·35	27·06	102	·0325	
50	10·94	·18	26·94	114	·0541	
75	·92	·24	·99	110	·0821	
100	·87	·32	27·07	103	·1087	
150	·50	·34	·15	96	·1585	
200	·03	·34	·23	90	·2050	
300	9·93	·31	·22	93	·2965	
[350]				91	·3425	62·2625
400	·50	·30	·29	88	·3870	
[500]	·34	·31	·32	87	·4745	
550	·30	·32	·33	87	·5180	148·3500

ENE. 3. 59°00′N 6°40′W 11.11.49
146 m. 2045-2125

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	11·78	35·20	26·80	126		
10	·78	·22	·82	124	·0125	
20	·77	·19	·80	126	·0250	
30	·76	·21	·82	125	·0376	
50	·70	·19	·81	126	·0627	
75	·54	·23	·87	121	·0936	
100	·34	·24	·91	118	·1235	
125	·26	·22	·92	118	·1530	
[135]				116	·1647	11·2783
140	·14	·24	·95	115	·1705	
[200]				100	·2350	
[300]				96	·3330	
[350]				94	·3805	70·5185

Var. 0-1. 58°50′N 6°26′W 11.11.49
124 m. 1730-1800

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	11·84	34·88	26·54	151		
10	·93	·97	·60	145	·0148	
20	12·21	35·09	·63	143	·0292	
30	·20	·12	·66	140	·0434	
50	·03	·14	·71	136	·0710	
75	11·88	·30	·86	122	·1032	
100	. . ·67	·29	·89	120	·1334	
120	·69	·22	·84	125	·1579	9·8490
[135]				120	·1763	12·3555

W. 3. 58°40′N 6′10°W 11.11.49
115 m. 1500-1600

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	11·98	34·78	26·44	160		
10	·99	·89	·52	153	·0156	
20	·94	·97	·60	145	·0305	
30	·93	·93	·57	149	·0452	
50	·93	35·09	·69	138	·0739	
75	12·00	34·97	·58	149	·1098	
100	11·94	·97	·60	147	·1468	
112	12·12	35·20	·74	134		
[120]				130	·1745	10·5947

VOLUME TRANSPORT

			Km³/hr.
60°54′N	8°16′W.	ΔQ = ·3889 × 550 − 119·1360 = 94·7590	
			− 2·10
60°45′N	8°08′W.	ΔQ = ·4089 × 550 − 122·7140 = 102·1810	
			+ 5·10
60°35′N	8°00′W.	ΔQ = ·3517 × 550 − 109·2543 = 84·1807	
			− 0·62
60°23½′N	7°49½′W.	ΔQ = ·3659 × 550 − 114·8782 = 86·3668	
			− 10·09
60°12′N	7°40′W.	ΔQ = ·4648 × 550 − 133·7500 = 121·8900	
			− 1·98
59°56′N	7°27′W.	ΔQ = ·4832 × 550 − 136·9352 = 128·8248	
			+ 0·53
59°44′N	7°15′W.	ΔQ = ·4785 × 550 − 136·2000 = 126·9750	
			+ 0·42
59°31′N	7°05′W.	ΔQ = ·4809 × 550 − 138·9890 = 125·5060	
			− 3·17
59°17′N	6°53′W.	ΔQ = ·5180 × 550 − 148·3500 = 136·5500	
”		ΔQ = ·3425 × 350 − 62·2625 = 57·6125	− 1·45
59°00′N	6°40′W.	ΔQ = ·3805 × 350 − 70·5185 = 62·6565	
”		ΔQ = ·1647 × 135 − 11·2783 = 10·9562	− 0·14
58°50′N	6°26′W.	ΔQ = ·1763 × 135 − 12·3555 = 11·4450	
”		ΔQ = ·1579 × 120 − 9·8490 = 9·0990	− 0·36
58°40′N	6°10′W.	ΔQ = ·1745 × 120 − 10·5947 = 10·3452	
			−13·86

NOLSØ, FAROE—FLUGGA, SHETLAND

F.R.S. *SCOTIA*

22-24 November, 1949

SE. 5-6. 62°00′N 6°12′W 22.11.49
106 m. 1722-1748

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	8·75	35·07	27·23	85		
10	·76	·06	·22	86	·0086	
20	·77	·07	·23	86	·0172	
30	·77	·06	·22	87	·0258	
50	·77	·06	·22	87	·0432	
75	·77	·05	·21	89	·0652	
100	·77	·03	·20	90	·0876	
[175]				87	·1540	13·4020

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SE. 5.			61°54′N 5°45′W			22.11.49
			243 m.			2135-2215
0	8·85	35·14	27·27	81		
10	·88	·15	·27	82	·0082	
20	·87	·15	·27	82	·0164	
30	·87	·14	·27	82	·0246	
50	·87	·16	·28	81	·0409	
75	·89	·16	·28	82	·0613	
100	·89	·17	·29	82	·0818	
150	·90	·17	·29	82	·1228	
[175]				83	·1434	12·5328
200	·91	·17	·28	84	·1643	16·3790
235	·92	·17	·28	85		
E. 4.			61°49′N 5°21′W			23.11.49
			157 m.			0025-0130
0	8·71	35·17	27·32	77		
10	·71	·17	·32	77	·0077	
20	·71	·17	·32	77	·0154	
30	·71	·17	·32	77	·0231	
50	·71	·19	·33	77	·0385	
75	·71	·18	·32	78	·0579	
100	·73	·19	·33	78	·0774	
150	·71	·17	·32	80	·1169	
[185]				82	·1453	13·3047
[200]				83	·1577	15·5772
Var. 5.			61°42′N 4°51′W			23.11.49
			214 m.			0440-0510
0	8·63	35·17	27·33	76		
10	·63	·16	·32	77	·0076	
20	·63	·14	·30	79	·0154	
30	·63	·14	·30	79	·0233	
50	·63	·13	·29	81	·0393	
75	·63	·14	·30	80	·0594	
100	·60	·15	·32	79	·0793	
150	·61	·17	·33	79	·1188	
[185]				82	·1470	13·5441
200	·61	·12	·29	83	·1594	
[300]				42	·2219	
[400]				4	·2449	
[500]				–13	·2359	
[575]				–12	·2265	99·6271
SE. 5.			61°35′N 4°15′W			23.11.49
			823 m.			0720-0830
0	8·63	35·16	27·32	77		
10	·63	·16	·32	77	·0077	
20	·63	·16	·32	77	·0154	
30	·63	·17	·33	76	·0230	
50	·63	·16	·32	78	·0384	
75	·64	·17	·33	77	·0578	
100	·64	·12	·29	81	·0776	
150	·65	·13	·29	82	·1184	
200	7·83	·23	·50	63	·1546	
250	·43	·16	·51	63	·1861	
300	6·32	·15	·66	49	·2141	
400	2·88	·21	28·08	8	·2426	
[500]	0·65	·23	·28	–13	·2401	
[570]				–12	·2313	97·5915
[575]				–12	·2307	98·7475
600	–0·03	·16	·26	–12		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SE. 5-6.			61°21′N 3°10′W			23.11.49
			1399 m.			1530-1630
0	8·66	35·03	27·21	87		
10	·66	·03	·21	87	·0087	
20	·62	·01	·20	88	·0175	
30	·62	·01	·20	89	·0263	
50	·62	·03	·22	87	·0439	
75	·58	·07	·26	84	·0653	
100	·55	·08	·27	83	·0862	
[150]	7·75	·09	·40	72	·1250	
200	6·40	·06	·57	56	·1570	
[250]	5·04	·01	·70	44	·1820	
[300]	3·72	34·94	·79	35	·2018	
[360]				24	·2195	47·3933
400	1·17	·87	·96	17	·2278	
[500]	0·05	·85	28·00	12	·2423	
[575]				11	·2509	98·2343
600	–0·30	·85	·02	10		
SE. 4-5.			61°14′N 2°40′W			23.11.49
			1079 m.			1920-2030
0	8·64	35·05	27·23	85		
10	·64	·05	·23	85	·0085	
20	·65	·05	·23	86	·0171	
30	·66	·06	·24	85	·0257	
50	·68	·06	·23	84	·0426	
75	·68	·05	·23	85	·0637	
100	·66	·05	·23	85	·0849	
150	·33	·22	·41	71	·1239	
200	·31	·34	·51	62	·1571	
[300]	7·75	·21	·50	65	·2206	
[360]				67	·2602	49·8078
400	6·57	34·97	·48	68	·2871	
[440]				65	·3137	72·7848
[500]	5·20	·85	·56	60		
E. 5-6.			61°08′N 2°10′W			23/24.11.49
			617 m.			2310-0045
0	10·14	35·22	27·11	97		
10	·16	·21	·11	97	·0097	
20	·18	·24	·12	96	·0193	
30	·15	·23	·12	96	·0289	
50	·15	·23	·12	97	·0482	
75	·14	·14	·05	104	·0733	
100	·18	·14	·05	104	·0993	
150	9·05	·12	·22	89	·1475	
200	·04	·13	·23	89	·1920	
300	8·46	·14	·33	81	·2770	
400	7·56	·11	·45	71	·3530	
[435]				64	·3766	87·2573
[440]				63	·3798	89·1453
500	5·33	·00	·66	51		
ESE. 5.			61°01′N 1°36′W			24.11.49
			156 m.			0320-0355
0	10·53	35·17	27·00	107		
10	·55	·18	·01	106	·0106	
20	·54	·18	·01	107	·0212	
30	·52	·22	·05	103	·0317	
50	·56	·20	·03	105	·0525	
75	·56	·22	·04	105	·0787	
100	·55	·22	·04	106	·1051	
[135]				106	·1422	9·5838
150	·53	·22	·05	106	·1581	
[200]				103	·2103	
[300]				96	·3098	
[400]				80	·3978	
[435]				71	·4242	96·8160

E. 5. 60°56′N 1°00′W 24.11.49
110 m. 1015-1110

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	10·86	35·16	26·94	113		
10	·87	·15	·93	114	·0114	
20	·89	·15	·93	114	·0228	
30	·89	·16	·94	113	·0342	
50	·89	·17	·95	113	·0568	
75	·90	·15	·93	115	·0853	
100	·91	·15	·93	116	·1142	
[135]				109	·1536	10·3795

VOLUME TRANSPORT

		Km³/hr
62°00′N 6°12′W.	ΔQ=·1540×175−13·4020=13·5480	+0·28
61°54′N 5°45′W.	ΔQ=·1434×175−12·5328=12·5622	
"	ΔQ=·1643×200−16·3790=16·4810	+0·15
61°49′N 5°21′W.	ΔQ=·1577×200−15·5772=15·9628	
"	ΔQ=·1453×185−13·3047=13·5758	−0·02
61°42′N 4°51′W.	ΔQ=·1470×185−13·5441=13·6509	
"	ΔQ=·2265×575−99·6271=30·6104	−0·92
61°35′N 4°15′W.	ΔQ=·2307×575−98·7475=33·9050	
"	ΔQ=·2307×575−98·7475=33·9050	−3·41
61°21′N 3°10′W.	ΔQ=·2509×575−98·2343=46·0332	
"	ΔQ=·2195×360−47·3933=31·6267	−3·44
61°14′N 2°40′W.	ΔQ=·2602×360−49·8078=43·8642	
"	ΔQ=·3137×440−72·7848=65·2432	−3·59
61°08′N 2°10′W.	ΔQ=·3798×440−89·1453=77·9667	
"	ΔQ=·3766×435−87·2573=76·5637	−3·15
61°01′N 1°36′W.	ΔQ=·4242×435−96·8160=87·7110	
"	ΔQ=·1422×135− 9·5838= 9·6132	−0·21
60°56′N 1°00′W.	ΔQ=·1536×135−10·3795=10·3565	
		-14·31

1950

LATITUDE 62°15′N, LONGITUDE 9°30′W
—FAROE BANK—BUTT OF LEWIS
F.R.S. *SCOTIA*
7-9 March, 1950

NE. 6. 62°15′N 9°30′W 9.3.50
549 m. 0740-0810

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	8·02	35·19	27·44	65		
10	7·99	·20	·45	65	·0065	
20	·95	·20	·46	64	·0129	
30	·96	·20	·45	65	·0193	
50	·77	·11	·42	68	·0326	
75	·76	·11	·42	69	·0497	
100	·76	·12	·44	67	·0667	
150	·76	·11	·42	70	·1009	
200	·70	·11	·44	69	·1357	
300	·53	·12	·47	68	·2042	
400	·23	·10	·49	67	·2717	
[475]				57	·318	76·3095
500	5·42	·00	·64	53		

NE/E. 6. 62°02′N 9°18′W 9.3.50
512 m. 0515-0550

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	7·92	35·10	27·39	70		
10	·92	·10	·39	70	·0070	
20	·92	·11	·40	70	·0140	
30	·92	·11	·40	70	·0210	
50	·94	·11	·39	71	·0351	
75	·91	·10	·39	71	·0529	
100	·91	·11	·40	71	·0707	
150	·88	·10	·40	72	·1065	
200	·91	·11	·40	73	·1427	
300	·63	·20	·51	64	·2112	
400	6·83	·15	·58	58	·2722	
450	4·50	·00	·75	41	·2970	
[465]				38	·3029	74·7752
[475]				32	·3061	77·8148

ESE. 5-6. 61°48′N 9°06′W 9.3.50
705 m. 0240-0320

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	8·24	35·11	27·34	75		
10	·24	·11	·34	75	·0075	
20	·24	·11	·34	75	·0150	
30	·24	·11	·34	75	·0225	
50	·25	·11	·34	76	·0376	
75	·25	·11	·34	76	·0566	
100	·25	·13	·35	76	·0756	
150	·26	·11	·34	78	·1141	
200	·31	·10	·32	80	·1536	
300	·24	·12	·35	79	·2331	
400	·14	·11	·35	81	·3131	
[465]				80	·3654	83·8997
[500]	7·95	·11	·38	80	·3936	
[600]				48	·4576	
[620]				41	·4665	148·9845

NE. 3. 61°35′N 8°53′W 8/9.3.50
759 m. 2320-0110

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	8·24	35·21	27·42	67		
10	·25	·17	·39	70	·0068	
20	·25	·19	·40	70	·0138	
30	·26	·19	·40	70	·0208	
50	·28	·19	·40	70	·0348	
75	·28	·19	·40	71	·0524	
100	·27	·20	·41	70	·0700	
150	·29	·20	·40	72	·1055	
200	·31	·20	·40	73	·1417	
300	·32	·17	·38	77	·2167	
400	·28	·23	·43	74	·2922	
[465]				73	·3400	77·9650
[500]	·23	·26	·46	73	·3657	
600	·18	·22	·44	77	·4407	
[620]				78	·4562	139·6025
650	·15	·18	·41	80		

W. 4. 61°21½′N 8°41′W 8.3.50
253 m. 2054-2140

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	8·18	35·19	27·41	68		
10	·20	·19	·41	68	·0068	
20	·18	·20	·42	68	·0136	
30	·18	·20	·42	68	·0204	
50	·18	·20	·42	68	·0340	
75	·18	·19	·41	70	·0512	
100	·19	·17	·40	71	·0688	
150	·19	·19	·41	71	·1043	
[175]				71	·1221	10·5725
200	·17	·19	·42	71	·1398	
250	·11	·20	·43	71	·1753	
[300]				71	·2108	
[400]				73	·2828	
[465]				74	·3306	75·9905

WNW. 3-4. 61°08′N 8°29′W, 95 m. 8.3.50, 1846-1925

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·01	35·17	27·42	67		
10	·01	·19	·44	66	·0066	
20	·01	·21	·45	65	·0132	
30	·01	·23	·47	63	·0196	
50	·02	·25	·48	62	·0321	
75	·02	·26	·49	62	·0476	
90	·02	·25	·48	63	·0570	
[130]				67	·0830	5·3937
[175]				70	·1138	9·8217

VOLUME TRANSPORT

		Km³/hr.
62°15′N 9°30′W.	$\Delta Q = \cdot3182\times475 - 76\cdot3095 = 74\cdot8355$	+2·03
62°02′N 9°18′W.	$\Delta Q = \cdot3061\times475 - 77\cdot8148 = 67\cdot5827$	
„	$\Delta Q = \cdot3029\times465 - 74\cdot7752 = 66\cdot0733$	−5·58
61°48′N 9°06′W.	$\Delta Q = \cdot3654\times465 - 83\cdot8997 = 86\cdot0113$	
„	$\Delta Q = \cdot4665\times620 - 148\cdot9845 = 140\cdot2455$	−0·84
61°35′N 8°53′W.	$\Delta Q = \cdot4562\times620 - 139\cdot6025 = 143\cdot2415$	
„	$\Delta Q = \cdot3400\times465 - 77\cdot9650 = 80\cdot1350$	+0·67
61°21½′N 8°41′W.	$\Delta Q = \cdot3306\times465 - 75\cdot9905 = 77\cdot7385$	
„	$\Delta Q = \cdot1221\times175 - 10\cdot5725 = 10\cdot7950$	+0·20
61°08′N 8°29′W.	$\Delta Q = \cdot1138\times175 - 9\cdot8217 = 10\cdot0933$	
„	$\Delta Q = \cdot0830\times130 - 5\cdot3937 = 5\cdot3963$	−0·10
60°54′N 8°16′W.	$\Delta Q = \cdot0878\times130 - 5\cdot6599 = 5\cdot7541$	
		−3·62

WSW. 3-4. 60°54′N 8°16′W, 168 m. 8.3.50, 1540-1725

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·05	35·16	27·41	68		
10	·05	·21	·45	65	·0066	
20	·04	·20	·44	66	·0132	
30	·04	·18	·43	67	·0198	
50	·05	·18	·43	67	·0332	
75	·04	·18	·43	68	·0501	
100	·03	·17	·42	69	·0672	
125	·03	·17	·42	69	·0844	
[130]				69	·0878	5·6599
160	7·86	·17	·46	66	·1080	
[200]				63	·1338	
[300]				57	·1938	
[400]				46	·2453	
[500]				26	·2813	
[550]				16	·2918	92·4249

Var. 3. 60°45′N 8°08′W, 888 m. 8.3.50, 1220-1320

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	7·98	35·19	27·44	65		
10	·98	·19	·44	66	·0066	
20	·96	·18	·44	66	·0132	
30	·98	·18	·44	66	·0198	
50	·99	·20	·45	65	·0329	
75	·98	·19	·44	67	·0494	
100	·99	·18	·44	67	·0662	
150	·96	·21	·46	66	·0994	
200	·94	·21	·47	66	·1324	
300	·26	·16	·54	61	·1959	
400	6·25	·06	·59	57	·2549	
[500]	3·48	34·97	·84	32	·2994	
[550]	2·08	·95	·95	20	·3124	95·1978
600	0·72	·94	28·04	10		

S. 2-3. 60°35′N 8°00′W, 954 m. 8.3.50, 0955-1100

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·05	35·30	27·36	73		
10	·05	·31	·37	72	·0072	
20	·06	·29	·35	74	·0145	
30	·06	·29	·35	74	·0219	
50	·08	·29	·35	75	·0368	
75	·06	·29	·35	75	·0556	
100	·10	·26	·32	79	·0748	
150	8·46	·22	·39	73	·1128	
200	·23	·23	·43	70	·1486	
300	·15	·16	·39	76	·2216	
400	7·18	·12	·51	65	·2921	
[500]	5·65	·09	·69	49	·3491	
[550]	4·45	·05	·80	38	·3709	109·1785

SW. 3. 60°23½′N 7°49½′W, 778 m. 8.3.50, 0725-0817

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·04	35·21	27·29	80		
10	·05	·21	·29	80	·0080	
20	·05	·21	·29	80	·0160	
30	·05	·21	·29	80	·0240	
50	·06	·21	·29	81	·0401	
75	·07	·21	·29	81	·0603	
100	·06	·21	·29	82	·0807	
150	·10	·23	·30	82	·1217	
200	·06	·23	·31	82	·1627	
300	·08	·23	·30	85	·2462	
400	·04	·23	·31	86	·3317	
[500]	8·60	·21	·36	83	·4162	
[550]	·03	·19	·43	76	·4560	124·7285
600	6·82	·15	·59	61		

SSW. 3. 60°12′N 7°40′W, 494 m. 8.3.50, 0450-0615

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·03	35·23	27·31	78		
10	·04	·22	·30	79	·0078	
20	·04	·24	·32	77	·0156	
30	·04	·23	·31	78	·0234	
50	·04	·23	·31	79	·0391	
75	·05	·24	·32	78	·0587	
100	·05	·23	·31	80	·0785	
150	·09	·22	·29	83	·1193	
200	·08	·21	·29	84	·1611	
300	8·79	·21	·33	82	·2441	
350	·49	·21	·38	78	·2841	
[400]				85	·3249	
[500]				85	·4099	
[550]				82	·4517	122·8385

SSW. 4. 59°56′N 7°27′W, 778 m. 8.3.50, 0240-0330

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·12	35·23	27·30	79		
10	·13	·23	·30	79	·0079	
20	·13	·22	·29	80	·0159	
30	·12	·23	·30	79	·0239	
50	·14	·23	·29	81	·0399	
75	·14	·22	·28	82	·0603	
100	·14	·23	·29	82	·1008	
150	·15	·23	·29	83	·1420	
200	·16	·23	·29	84	·1838	
[300]	·15	·23	·29	86	·2688	
400	·14	·23	·29	88	·3558	
[500]	·08	·23	·30	89	·4443	
[550]	·05	·23	·31	89	·4888	135·6693
600	·02	·23	·31	90		

SW/S. 3. 59°44′N 7°15′W 7/8.3.50
1064 m. 2350-0135

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·13	35·30	27·35	74		
10	·13	·26	·32	77	·0076	
20	·14	·30	·34	75	·0152	
30	·14	·30	·34	75	·0227	
50	·15	·30	·34	76	·0378	
75	·15	·28	·33	77	·0569	
100	·15	·30	·34	77	·0761	
150	·16	·26	·31	81	·1156	
200	·16	·25	·30	83	·1566	
[300]	·18	·28	·32	83	·2396	
400	·20	·30	·34	83	·3226	
[500]	·20	·30	·34	85	·4066	
[550]	·19	·30	·34	86	·4494	121·1703
600	·19	·28	·32	89		

SW. 3-4. 59°31′N 7°05′W 7.3.50
1005 m. 2150-2235

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·14	35·30	27·34	75		
10	·14	·26	·32	77	·0076	
20	·15	·26	·31	78	·0154	
30	·15	·27	·32	77	·0232	
50	·16	·29	·34	76	·0385	
75	·16	·26	·31	79	·0579	
100	·16	·23	·29	82	·0780	
150	·18	·28	·32	80	·1185	
200	·19	·27	·32	81	·1587	
[300]	·20	·33	·36	79	·2387	
400	·20	·33	·36	81	·3187	
[500]	·17	·30	·34	85	·4017	
[550]	·15	·29	·34	86	·4445	120·6243
600	·13	·28	·33	88		

SSW. 3. 59°17′N 6°53′W 7.3.50
576 m. 1920-2025

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·34	35·30	27·31	78		
10	·34	·32	·33	76	·0077	
20	·34	·30	·31	78	·0154	
30	·34	·27	·29	80	·0233	
50	·32	·25	·28	81	·0394	
75	·25	·24	·28	82	·0598	
100	·22	·26	·30	81	·0802	
150	·22	·27	·31	81	·1207	
200	·18	·27	·32	81	·1612	
300	·08	·30	·35	80	·2417	
[360]				81	·2900	53·3305
400	·09	·31	·36	81	·3222	
500	·10	·27	·33	86	·4057	
[550]				86	·4487	122·1295

Var. 2-3. 59°00′N 6°40′W 7.3.50
141 m. 1653-1722

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·24	35·30	27·33	76		
10	·26	·30	·33	76	·0076	
20	·26	·30	·33	76	·0152	
30	·26	·30	·33	76	·0228	
50	·27	·30	·33	77	·0381	
75	·12	·30	·35	75	·0571	
100	·08	·32	·37	74	·0757	
[125]				74	·0942	5·9248
138	·01	·32	·38	74		
[150]				74	·1127	
[200]				75	·1499	
[300]				80	·2274	
[360]				81	·2757	49·0340

SE. 3. 58°50′N 6°26′W 7.3.50
113 m. 1445-1542

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·85	35·30	27·39	70		
10	·85	·37	·45	65	·0068	
20	·85	·33	·42	68	·0134	
30	·84	·35	·43	67	·0202	
50	·80	·36	·45	65	·0334	
75	·65	·29	·42	69	·0502	
110	·72	·34	·44	68	·0742	
[115]				70	·0776	4·4405
[125]				72	·0847	5·2520

Var. 1-2. 58°40′N 6°10′W 7.3.50
121 m. 1118-1200

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·13	35·15	27·39	70		
10	·09	·15	·39	70	·0070	
20	·05	·14	·39	70	·0140	
30	·05	·15	·40	70	·0210	
50	·01	·14	·40	70	·0350	
75	7·98	·14	·40	70	·0525	
100	·98	·17	·43	68	·0697	
[115]				67	·0798	4·6175
118	·98	·19	·44	67		

VOLUME TRANSPORT

		Km³/hr.
60°54′N 8°16′W.	△Q=·2918×550− 92·4249= 68·0651	−2·42
60°45′N 8°08′W.	△Q=·3124×550− 95·1978= 76·6222	−5·14
60°35′N 8°00′W.	△Q=·3709×550−109·1785= 94·8165	−8·87
60°23½′N 7°49½′W.	△Q=·4560×550−124·7285=126·0715	+0·14
60°12′N 7°40′W.	△Q=·4517×550−122·8385=125·5965	−2·16
59°56′N 7°27′W.	△Q=·4888×550−135·6693=133·1707	+2·05
59°44′N 7°15′W.	△Q=·4494×550−121·1703=125·9997	+0·61
59°31′N 7°05′W.	△Q=·4445×550−120·6243=123·8507	−0·23
59°17′N 6°53′W.	△Q=·4487×550−122·1295=124·6555	
”	△Q=·2900×360− 53·3305= 51·0695	+0·24
59°00′N 6°40′W.	△Q=·2757×360− 49·0340= 50·2180	
”	△Q=·0942×125− 5·9248= 5·8502	+0·15
58°50′N 6°26′W.	△Q=·0847×125− 5·2520= 5·3355	
”	△Q=·0776×115− 4·4405= 4·4835	−0·02
58°40′N 6°10′W.	△Q=·0798×115− 4·6175= 4·5595	
		−15·65

VIDERØ, FAROE, NORTHWARD ON LONGITUDE 6°35′W TO LATITUDE 63°30′N

F.R.S. *SCOTIA*

9-10 March, 1950

W. 4-5. 63°30′N 6°35′W 9/10.3.50
1491 m. 2350-0100

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	5·38	35·03	27·68	43		
10	·38	·02	·67	44	·0044	
20	·30	·02	·68	43	·0088	
30	·24	·02	·69	42	·0130	
50	·17	·01	·69	42	·0214	
75	4·84	34·99	·71	41	·0318	
100	5·19	·98	·66	46	·0427	
150	3·56	·94	·81	32	·0622	4·7597
200	2·06	·78	·71	40		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
W/N. 6.			63°18½′N 6°35′W 1426 m.			10.3.50 0230-0430
0	6·44	35·05	27·56	54		
10	·44	·07	·57	53	·0054	
20	·43	·07	·57	53	·0107	
30	·43	·06	·57	53	·0160	
50	·39	·07	·58	53	·0266	
75	·25	·05	·58	53	·0398	
100	5·98	·04	·61	51	·0528	
150	6·14	·05	·60	52	·0786	5·9395
200	5·66	·04	·65	48	·1036	
[270]				36	·1330	18·7755
400	0·40	34·84	·98	14		
W/N. 5.			63°06′N 6°35′W 1445 m.			10.3.50 0535-0630
0	6·92	35·12	27·55	55		
10	·88	·11	·55	55	·0055	
20	·86	·09	·54	56	·0111	
30	·82	·10	·55	55	·0167	
50	·82	·10	·55	56	·0278	
75	·74	·10	·56	55	·0417	
100	·71	·09	·55	56	·0556	
150	·59	·08	·57	55	·0834	
200	·61	·10	·57	56	·1112	
[270]				45	·1466	20·1425
[300]				40	·1594	
[390]				26	·1891	40·4150
400	2·01	34·89	·90	24		
W/N. 6.			62°55′N 6°35′W 869 m.			10.3.50 0840-0930
0	7·51	35·16	27·50	60		
10	·51	·16	·50	60	·0060	
20	·51	·16	·50	60	·0120	
30	·51	·14	·48	62	·0181	
50	·51	·16	·50	61	·0304	
75	·51	·14	·48	63	·0459	
100	·49	·14	·48	63	·0617	
150	·47	·17	·52	60	·0925	
200	·47	·17	·52	61	·1227	
[300]				58	·1822	
[390]				54	·2326	46·2003
400	6·11	·08	·62	54	·2382	
[420]				50	·2486	53·4223
600	1·32	34·88	·96	18		
N. 5.			62°43′N 6°35′W 183 m.			10.3.50 1050-1120
0	7·56	35·13	27·47	62		
10	·56	·13	·47	63	·0062	
20	·56	·13	·47	63	·0125	
30	·56	·12	·46	64	·0189	
50	·57	·14	·48	62	·0315	
75	·57	·19	·52	59	·0466	
100	·57	·17	·50	61	·0616	
125	·57	·17	·50	62	·0770	
145				62	·0894	6·5107
160	·57	·17	·50	62	·0987	
[200]				61	·1233	
[300]				58	·1828	
[400]				55	·2393	
[420]				53	·2501	53·6655
N. 5.			62°32′N 6°35′W 101 m.			10.3.50 1235-1310
0	7·10	35·11	27·52	58		
10	·07	·10	·51	59	·0058	
20	6·75	·11	·57	53	·0114	
30	·45	·08	·58	52	·0166	
50	·37	·09	·60	51	·0269	
75	·35	·08	·59	52	·0398	
96	·35	·08	·59	53	·0508	
[145]				58	·0780	5·6307

Volume Transport

		Km³/hr
63°30′N 6°35′W.	$\Delta Q = {\cdot}0622 \times 150 - 4{\cdot}7597 = 4{\cdot}5703$	−0·35
63°18½N 6°35′W.	$\Delta Q = {\cdot}0786 \times 150 - 5{\cdot}9395 = 5{\cdot}8505$	
„	$\Delta Q = {\cdot}1330 \times 270 - 18{\cdot}7755 = 17{\cdot}1345$	−0·64
63°06′N 6°35′W.	$\Delta Q = {\cdot}1466 \times 270 - 20{\cdot}1425 = 19{\cdot}4395$	
„	$\Delta Q = {\cdot}1891 \times 390 - 40{\cdot}4150 = 33{\cdot}3340$	−3·10
62°55′N 6°35′W.	$\Delta Q = {\cdot}2326 \times 390 - 46{\cdot}2003 = 44{\cdot}5137$	
„	$\Delta Q = {\cdot}2486 \times 420 - 53{\cdot}4223 = 50{\cdot}9897$	−0·11
62°43′N 6°35′W.	$\Delta Q = {\cdot}2501 \times 420 - 53{\cdot}6655 = 51{\cdot}3765$	
„	$\Delta Q = {\cdot}0894 \times 145 - 6{\cdot}5107 = 6{\cdot}4523$	+0·21
62°32′N 6°35′W.	$\Delta Q = {\cdot}0780 \times 145 - 5{\cdot}6307 = 5{\cdot}6793$	
		−3·99

LATITUDE 62°02′N, LONGITUDE 9°18′W.—FAROE BANK—BUTT OF LEWIS

F.R.S. *SCOTIA*

12-14 May, 1950

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
N. 1.			62°02′N 9°18′W 576 m.			13/14.5.50 2325-0030
0	9·11	35·17	27·25	83		
10	8·97	·20	·30	79	·0081	
20	·85	·17	·29	80	·0161	
30	·55	·17	·34	75	·0239	
50	·44	·17	·36	74	·0388	
75	·30	·17	·38	72	·0570	
100	·22	·17	·39	72	·0750	
150	·16	·17	·40	72	·1110	
200	·12	·17	·40	72	·1470	
300	·08	·15	·40	75	·2205	
400	·04	·14	·40	76	·2960	
[500]				75	·3715	
550	3·81	34·97	·81	35	·3990	
[600]				70	·4252	
[700]				44	·4822	
[725]				35	·4921	189·9273
N. 2.			61°48′N 9°06′W 842 m.			13.5.50 2125-2150
0	9·12	35·25	27·31	78		
10	8·91	·27	·36	73	·0076	
20	·79	·25	·37	72	·0148	
30	·53	·25	·41	69	·0218	
50	·32	·23	·42	68	·0355	
75	·24	·25	·45	66	·0523	
100	·23	·25	·45	66	·0688	
150	·35	·26	·44	68	·1023	
200	·14	·25	·47	66	·1358	
300	·10	·27	·49	66	·2018	
400	·06	·26	·49	68	·2688	
600	7·92	·25	·50	71	·4078	
[700]				42	·4643	
[715]				37	·4702	172·4311
[725]				35	·4738	177·1511
800	0·87	34·97	28·05	9		

N. 2-3. 61°35′N 8°53′W 650 m. 13.5.50 1845-2000

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	9·67	35·25	27·22	86		
10	·37	·25	·27	82	·0084	
20	·21	·28	·32	77	·0164	
30	8·29	·23	·43	67	·0236	
50	·48	·21	·38	72	·0375	
75	·80	·30	·40	71	·0554	
100	·46	·39	·53	59	·0716	
150	·28	·26	·45	67	·1031	
200	·26	·20	·41	72	·1379	
300	·21	·26	·46	69	·2084	
400	·20	·25	·46	71	·2786	
[475]				72	·3320	78·6632
600	·08	·25	·47	74	·4234	
[700]				40	·4804	
[715]				35	·4860	178·3912

N. 2. 61°21½′N 8°41′W 304 m. 13.5.50 1630-1700

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	9·68	35·22	27·20	88		
10	·61	·21	·20	88	·0088	
20	·08	·22	·30	79	·0172	
30	8·90	·23	·32	77	·0250	
50	·57	·20	·36	74	·0401	
75	·41	·25	·42	69	·0580	
100	·26	·23	·43	68	·0751	
150	·22	·26	·46	66	·1086	
200	·15	·25	·46	67	·1418	14·7785
300	·12	·28	·49	66	·2083	
[400]				70	·2763	
[475]				72	·3295	79·2310

N. 2. 61°08′N 8°29′W 95 m. 13.5.50 1425-1450

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	9·03	35·20	27·29	80		
10	8·21	·21	·42	67	·0074	
20	·10	·21	·44	66	·0140	
30	·07	·21	·45	65	·0206	
50	·06	·21	·45	65	·0336	
75	·04	·21	·45	66	·0500	
90	·12	·21	·44	67	·0600	
[135]				67	·0902	6·1085
[200]				67	·1338	13·3885

VOLUME TRANSPORT

			Km³/hr
62°02′N	9°18′W.	$\Delta Q = \cdot 4921 \times 725 - 189\cdot 9273 = 166\cdot 8452$	+0·14
61°48′N	9°06′W.	$\Delta Q = \cdot 4738 \times 725 - 177\cdot 1511 = 166\cdot 3539$	
”		$\Delta Q = \cdot 4702 \times 715 - 172\cdot 4311 = 163\cdot 7619$	−1·49
61°35′N	8°53′W.	$\Delta Q = \cdot 4860 \times 715 - 178\cdot 3912 = 169\cdot 0988$	
”		$\Delta Q = \cdot 3320 \times 475 - 78\cdot 6632 = 79\cdot 0368$	+0·49
61°21½′N	8°41′W.	$\Delta Q = \cdot 3295 \times 475 - 79\cdot 2310 = 77\cdot 2815$	
”		$\Delta Q = \cdot 1418 \times 200 - 14\cdot 7785 = 13\cdot 5815$	+0·06
61°08′N	8°29′W.	$\Delta Q = \cdot 1338 \times 200 - 13\cdot 3885 = 13\cdot 3715$	
”		$\Delta Q = \cdot 0902 \times 135 - 6\cdot 1085 = 6\cdot 0685$	−0·27
60°54′N	8°16′W.	$\Delta Q = \cdot 1034 \times 135 - 6\cdot 9300 = 7\cdot 0290$	
			−1·07

N. 1. 60°54′N 8°16′W 179 m. 13.5.50 1030-1120

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	9·32	35·16	27·21	87		
10	8·71	·22	·35	74	·0080	
20	·51	·19	·36	73	·0154	
30	·42	·17	·36	74	·0228	
50	·24	·11	·34	76	·0378	
75	·24	·11	·34	76	·0568	
100	·02	·08	·35	76	·0758	
[135]				82	·1034	6·9300
150	·63	·10	·27	84	·1158	
175	·11	·13	·38	74	·1356	
[200]				74	·1541	
[300]				77	·2296	
[400]				77	·3066	
[500]				77	·3836	
[550]				73	·4211	115·9702

N. 2. 60°45′N 8°08′W 860 m. 13.5.50 0755-0915

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	9·82	35·19	27·15	93		
10	·81	·23	·18	90	·0092	
20	·63	·22	·20	88	·0181	
30	·31	·20	·24	85	·0267	
50	·06	·23	·31	79	·0431	
75	·02	·24	·32	78	·0627	
100	8·98	·24	·33	78	·0822	
150	·94	·23	·33	79	·1214	
200	·93	·20	·31	82	·1616	
300	·77	·17	·31	84	·2446	
400	·50	·17	·35	82	·3276	
[500]	·15	·15	·39	79	·4081	
[550]	7·87	·13	·42	77	·4471	123·4882
600	·32	·10	·47	73		

N. 1. 60°35′N 8°00′W 923 m. 13.5.50 0610-0650

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	9·25	35·34	27·24	84		
10	·91	·35	·26	83	·0084	
20	·77	·33	·27	82	·0166	
30	·51	·29	·28	81	·0248	
50	·82	·36	·28	82	·0411	
75	·12	·37	·41	70	·0601	
100	·04	·39	·43	68	·0773	
150	·04	·30	·37	75	·1131	
200	·17	·35	·38	75	·1506	
300	8·93	·36	·43	72	·2241	
400	·89	·35	·43	74	·2971	
[500]	·09	·21	·44	75	·3716	
[550]	6·30	·00	·54	64	·4064	113·0480
600	2·16	34·88	·89	26		

N. 1. 60°23½′N 7°49½′W 805 m. 13.5.50 0320-0500

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	10·02	35·31	27·21	87		
10	9·97	·31	·22	86	·0086	
20	·43	·26	·27	82	·0170	
30	·26	·29	·32	77	·0250	
50	·12	·29	·34	76	·0403	
75	·10	·28	·34	76	·0593	
100	·03	·27	·34	77	·0784	
150	8·98	·27	·35	77	·1169	
200	·98	·26	·34	79	·1559	
300	·88	·28	·38	77	·2339	
400	·72	·26	·38	79	·3119	
[500]	7·63	·14	·46	72	·3874	
[550]	5·07	·03	·72	46	·4169	117·5552
600	1·25	34·93	28·00	14		

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
N. 1.			60°12′N 7°40′W			13.5.50
			622 m.			0120-0200
0	10·02	35·26	27·17	91		
10	9·89	·26	·19	89	·0090	
20	·64	·26	·23	86	·0178	
30	·43	·28	·29	80	·0261	
50	·21	·26	·30	80	·0421	
75	·11	·28	·34	76	·0616	
100	·08	·28	·34	77	·0807	
150	·08	·28	·34	78	·1195	
200	·04	·28	·35	78	·1585	
300	8·97	·28	·36	79	·2370	
400	·89	·26	·36	81	·3170	
[500]	·73	·23	·36	83	·3990	
[550]	·64	·20	·35	85	·4410	120·3855
600	·53	·18	·35	85		
N. 2.			59°56′N 7°27′W			12.5.50
			787 m.			2255-2330
0	9·92	35·28	27·20	88		
10	·71	·26	·22	86	·0087	
20	·61	·28	·25	84	·0172	
30	·56	·28	·26	83	·0256	
50	·36	·30	·31	79	·0418	
75	·20	·28	·32	78	·0614	
100	·14	·26	·32	79	·0810	
150	·12	·28	·34	78	·1202	
200	·16	·26	·32	81	·1600	
300	·08	·26	·33	82	·2415	
400	·03	·26	·33	84	·3245	
[500]	8·97	·26	·34	85	·4090	
[550]	·95	·25	·34	86	·4518	122·7360
600	·76	·25	·37	84		
N. 1.			59°44′N 7°15′W			12.5.50
			1033 m.			1955-2145
0	10·01	35·37	27·26	82		
10	9·85	·34	·26	83	·0082	
20	·74	·28	·23	86	·0166	
30	·45	·28	·28	81	·0250	
50	·25	·28	·31	79	·0410	
75	·12	·28	·34	76	·0604	
100	·53	·28	·27	84	·0804	
150	·43	·28	·28	84	·1224	
200	·03	·28	·35	78	·1629	
300	·04	·30	·36	79	·2414	
400	8·99	·28	·36	81	·3214	
[500]	·91	·27	·36	83	·4034	
[550]	·86	·26	·36	84	·4452	122·0730
600	·82	·26	·37	84		
NNE. 2-3.			59°31′N 7°05′W			12.5.50
			1042 m.			1740-1820
0	11·13	35·30	27·00	107		
10	10·40	·30	·13	95	·0101	
20	9·61	·32	·28	81	·0189	
30	·45	·32	·31	78	·0269	
50	·23	·32	·35	75	·0422	
75	·20	·30	·34	76	·0611	
100	·28	·34	·36	75	·0800	
150	·37	·35	·35	77	·1180	
200	·22	·30	·34	79	·1570	
300	·07	·34	·39	76	·2345	
400	·04	·34	·40	77	·3110	
[500]	·01	·30	·37	82	·3905	
[550]	8·98	·27	·35	85	·4323	118·4905
600	·96	·26	·35	86		

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
NNE. 1.			59°17′N 6°53′W			12.5.50
			412 m.			1540-1605
0	11·20	35·32	27·00	107		
10	10·81	·32	·08	100	·0104	
20	·07	·30	·19	89	·0198	
30	9·89	·30	·22	87	·0286	
50	·67	·30	·26	83	·0456	
75	·63	·30	·27	83	·0664	
100	·44	·30	·30	81	·0869	
150	·35	·30	·31	81	·1274	
200	·38	·32	·32	81	·1679	
250	·27	·26	·30	84	·2091	
[280]				83	·2341	33·3162
300	·12	·27	·33	82	·2506	
400	·10	·28	·34	83	·3331	
[500]				85	·4171	
[550]				85	·4596	126·7732
Calm.			59°00′N 6°40′W			12.5.50
			146 m.			1255-1350
0	11·11	35·26	26·98	109		
10	9·90	·26	27·19	89	·0099	
20	·61	·27	·25	84	·0185	
30	·24	·27	·31	78	·0266	
50	·05	·26	·33	77	·0421	
75	·02	·28	·35	75	·0611	
100	·02	·28	·35	76	·0800	
[135]				75	·1064	7·4198
145	8·81	·26	·37	75	·1139	
[200]				81	·1568	
[280]				83	·2224	31·1335
Calm.			58°50′N 6°26′W			12.5.50
			124 m.			0930-1010
0	10·37	35·23	27·09	98		
10	9·40	·25	·27	82	·0090	
20	·12	·26	·32	77	·0170	
30	·01	·28	·36	74	·0246	
50	8·82	·27	·38	72	·0392	
75	·62	·25	·39	71	·0571	
100	·60	·23	·38	73	·0751	
120	·60	·26	·40	72	·0896	
[125]				72	·0932	5·9813
[135]				73	·1004	6·9493
Var. 0-1.			58°40′N 6°10′W			12.5.50
			123 m.			0655-0810
0	11·39	35·28	26·94	113		
10	10·21	·28	27·15	93	·0103	
20	8·63	·26	·40	70	·0185	
30	·71	·25	·38	72	·0256	
50	·70	·32	·43	67	·0395	
75	·66	·23	·37	73	·0570	
100	·67	·26	·40	71	·0750	
120	·67	·26	·40	72	·0893	
[125]				72	·0929	6·0217

Volume Transport

			Km³/hr
60°54′N	8°16′W.	ΔQ=·4211×550−115·9702=115·6348	−1·92
60°45′N	8°08′W.	ΔQ=·4471×550−123·4882=122·4168	+3·38
60°35′N	8°00′W.	ΔQ=·4064×550−113·0480=110·4720	−0·36
60°23½′N	7°49½′W.	ΔQ=·4169×550−117·5552=111·7398	−2·96
60°12′N	7°40′W.	ΔQ=·4410×550−120·3855=122·1645	−1·02
59°56′N	7°27′W.	ΔQ=·4518×550−122·7360=125·7540	+0·85
59°44′N	7°15′W.	ΔQ=·4452×550−122·0730=122·7870	+1·00
59°31′N	7°05′W.	ΔQ=·4323×550−118·4905=119·2745	−1·93
59°17′N	6°53′W.	ΔQ=·4596×550−126·7732=126·0068	
”		ΔQ=·2341×280− 33·3162= 32·2318	+0·31
59°00′N	6°40′W.	ΔQ=·2224×280− 31·1335= 31·1385	
”		ΔQ=·1064×135− 7·4198= 6·9442	+0·10
58°50′N	6°26′W.	ΔQ=·1004×135− 6·9493= 6·6047	
”		ΔQ=·0932×125− 5·9813= 5·6687	+0·02
58°40′N	6°10′W.	ΔQ=·0929×125− 6·0217= 5·5908	
			−2·53

NOLSØ, FAROE—FLUGGA, SHETLAND

F.R.S. *SCOTIA*

21-23 May, 1950

ENE. 3. 62°00′N 6°12′W 21.5.50
111 m. 2240-2320

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	7·54	35·15	27·48	62		
10	·53	·15	·48	62	·0062	
10	·43	·13	·48	62	·0124	
30	·39	·12	·48	62	·0186	
50	·38	·12	·48	62	·0310	
75	·41	·12	·47	64	·0468	
105	·32	·12	·49	62	·0657	
[150]				61	·0934	
[175]				61	·1086	9·5398

E/N. 3. 61°54′N 5°45′W 22.5.50
238 m. 0115-0222

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	7·89	35·12	27·40	69		
10	·91	·15	·43	66	·0068	
20	·91	·14	·42	68	·0135	
30	·82	·15	·44	66	·0202	
50	·73	·22	·51	60	·0328	
75	·23	·12	·50	61	·0479	
100	·03	·20	·59	53	·0622	
150	·73	·14	·44	68	·0925	
[175]				64	·1090	9·6053
200	·31	·20	·55	59	·1243	
[210]				59	·1302	13·7790

E/N. 4. 61°49′N 5°21′W 22.5.50
183 m. 0530-0610

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	7·88	35·16	27·44	65		
10	·88	·20	·47	63	·0064	
20	·85	·17	·45	65	·0128	
30	·71	·12	·43	67	·0194	
50	·54	·17	·50	61	·0322	
75	·75	·16	·46	65	·0480	
100	·71	·16	·46	65	·0643	
150	·51	·16	·49	63	·0963	
175	·56	·16	·48	64	·1122	
[200]				64	·1281	12·8363
[210]				64	·1345	14·1493

E/N. 4. 61°42′N 4°51′W 22.5.50
218 m. 0810-0843

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·11	35·20	27·44	65		
10	·12	·20	·44	66	·0066	
20	·12	·17	·41	69	·0134	
30	·12	·20	·44	66	·0202	
50	·12	·12	·37	73	·0341	
75	7·68	·17	·48	63	·0511	
100	·45	·17	·51	60	·0665	
150	·27	·16	·53	59	·0963	
[200]	·33	·16	·52	61	·1263	13·0140
210	·43	·16	·50	63	·1325	
[300]				56	·1848	
[345]				50	·2086	37·4205

NE/E. 4. 61°35′N 4°15′W 22.5.50
587 m. 1220-1310

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·89	35·23	27·34	75		
10	·90	·21	·32	77	·0076	
20	·91	·23	·33	76	·0153	
30	·91	·23	·33	76	·0229	
50	·86	·20	·32	78	·0383	
75	·27	·20	·41	70	·0568	
100	·02	·16	·42	69	·0742	
150	7·41	·15	·51	61	·1067	
200	·12	·16	·56	57	·1362	
[295]				48	·1861	29·6860
300	6·25	·18	·67	48	·1887	
[345]				44	·2094	39·5790
400	3·72	34·90	·76	39		

E/N. 4. 61°28′N 3°42′W 22.5.50
1226 m. 1540-1625

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·72	35·19	27·33	76		
10	·72	·22	·36	73	·0075	
20	·72	·19	·33	76	·0150	
30	7·49	·19	·52	58	·0217	
50	·43	·16	·50	60	·0335	
75	·12	·12	·52	59	·0484	
100	·96	·13	·40	71	·0647	
150	·12	·14	·53	59	·0972	
200	6·02	·01	·49	63	·1277	
[260]				44	·1598	21·6181
[295]				34	·1738	27·3143
300	3·29	34·91	·82	32		

ENE. 5. 61°21′N 3°10′W 22.5.50
1324 m. 1855-2100

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·01	35·15	27·41	68		
10	·01	·17	·42	67	·0068	
20	·01	·15	·41	69	·0136	
30	·01	·16	·42	68	·0205	
50	·02	·10	·37	73	·0346	
75	7·92	·14	·42	69	·0524	
100	8·07	·11	·37	74	·0703	
150	7·32	·10	·47	65	·1051	
200	6·91	·06	·51	62	·1369	
[260]				58	·1729	23·2078
[300]	·10	·01	·58	56	·1959	
[335]				47	·2139	37·7253
400	2·66	34·86	·84	30		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
NE. 4.			61°14′N 2°40′W 932 m.			22.5.50 2300-2350
0	9·11	35·20	27·28	80		
10	·16	·23	·29	80	·0080	
20	·16	·22	·28	81	·0161	
30	·15	·23	·29	80	·0242	
50	·02	·21	·30	80	·0402	
75	8·14	·18	·41	70	·0590	
100	7·93	·21	·47	64	·0758	
150	·63	·12	·44	68	·1088	
200	·37	·14	·51	62	·1413	
300	6·55	·08	·57	58	·2013	
[335]				55	·2211	39·3205
[395]				49	·2521	53·4650
400	5·06	34·96	·67	48		
NE. 4.			61°08′N 2°10′W 421 m.			23.5.50 0140-0233
0	9·23	35·41	27·42	67		
10	·23	·33	·36	73	·0070	
20	·23	·33	·36	73	·0143	
30	·25	·35	·37	73	·0216	
50	·26	·31	·34	76	·0365	
75	·08	·35	·40	71	·0549	
100	·02	·31	·38	73	·0729	
150	8·94	·31	·39	73	·1094	
200	·64	·29	·42	71	·1454	
[275]				72	·1633	26·1457
300	·37	·25	·43	72	·2169	
350	7·96	·27	·52	66	·2514	
[395]				61	·2767	56·1405
N/E. 5.			61°01′N 1°36′W 132 m.			23.5.50 0610-0700
0	9·14	35·36	27·40	69		
10	·14	·30	·35	74	·0072	
20	·14	·34	·38	71	·0145	
30	·13	·35	·39	71	·0216	
50	·12	·30	·35	75	·0362	
75	8·76	·29	·40	71	·0545	
[100]	·73	·29	·40	71	·0723	
[120]				71	·0865	5·2098
125	·72	·29	·41	71		
[150]				71	·1078	
[200]				71	·1433	
[275]				72	·1969	29·6593
NE. 4.			60°56·N 1°00′W 110 m.			23.5.50 1015-1100
0	8·82	35·29	27·39	70		
10	·82	·26	·37	72	·0071	
20	·81	·29	·29	80	·0147	
30	·81	·29	·29	80	·0227	
50	·82	·30	·40	70	·0377	
75	·50	·28	·44	67	·0548	
100	·57	·31	·45	66	·0714	
[120]				67	·0847	5·2302

VOLUME TRANSPORT

		Km³/hr.
62°00′N 6°12′W.	$\Delta Q = \cdot1086 \times 175 - 9\cdot5398 = 9\cdot4652$	−0
61°54′N 5°45′W.	$\Delta Q = \cdot1090 \times 175 - 9\cdot6053 = 9\cdot4697$	
„	$\Delta Q = \cdot1302 \times 210 - 13\cdot7790 = 13\cdot5630$	−0·15
61°49′N 5°21′W.	$\Delta Q = \cdot1345 \times 210 - 14\cdot1439 = 14\cdot0957$	
„	$\Delta Q = \cdot1281 \times 200 - 12\cdot8363 = 12\cdot7837$	+0·15
61°42′N 4°51′W.	$\Delta Q = \cdot1263 \times 200 - 13\cdot0140 = 12\cdot2460$	
„	$\Delta Q = \cdot2086 \times 345 - 37\cdot4205 = 34\cdot5465$	+0·53
61°35′N 4°15′W.	$\Delta Q = \cdot2094 \times 345 - 39\cdot5790 = 32\cdot6640$	
61°35′N 4°15′W.	$\Delta Q = \cdot1861 \times 295 - 29\cdot6860 = 25\cdot2135$	+0·35
61°28′N 3°42′W.	$\Delta Q = \cdot1738 \times 295 - 27\cdot3143 = 23\cdot9567$	
„	$\Delta Q = \cdot1598 \times 260 - 21\cdot6181 = 19\cdot9299$	−0·53
61°21′N 3°10′W.	$\Delta Q = \cdot1729 \times 260 - 23\cdot2078 = 21\cdot8062$	
„	$\Delta Q = \cdot2139 \times 335 - 37\cdot7253 = 33\cdot9312$	−0·23
61°14′N 2°40′W.	$\Delta Q = \cdot2211 \times 335 - 39\cdot3205 = 34\cdot7480$	
„	$\Delta Q = \cdot2521 \times 395 - 53\cdot4650 = 46\cdot1145$	−1·98
61°08′N 2°10′W.	$\Delta Q = \cdot2767 \times 395 - 56\cdot1405 = 53\cdot1560$	
„	$\Delta Q = \cdot1633 \times 275 - 26\cdot1457 = 18\cdot7618$	−1·62
61°01′N 1°36′W.	$\Delta Q = \cdot1969 \times 275 - 29\cdot6593 = 24\cdot4882$	
„	$\Delta Q = \cdot0865 \times 120 - 5\cdot2098 = 5\cdot1702$	+0·07
60°56′N 1°00′W.	$\Delta Q = \cdot0847 \times 120 - 5\cdot2302 = 4\cdot9338$	
		−3·41

VIDERØ, FAROE, NORTHWARD ON LONGITUDE 6°35′W TO LATITUDE 63°30′N

F.R.S. *SCOTIA*

29-30 May, 1950

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
NNE. 5.			63°30′N 6°35′W 1404 m.			30.5.50 0255-0400
0	7·91	35·22	27·49	61		
10	·91	·17	·45	65	·0063	
20	·91	·18	·46	64	·0127	
30	·86	·18	·47	63	·0191	
50	·02	·17	·58	53	·0307	
75	6·51	·17	·65	47	·0432	
100	5·79	·07	·66	46	·0548	
150	·72	·17	·75	38	·0758	
200	6·23	·12	·64	49	·0976	
300	4·02	34·89	·72	42	·1431	
400	6·55	35·06	·55	61	·1946	39·4523
500	0·70	34·91	28·02	11		
NNE. 5.			63°18½N 6°35′W 1362 m.			29/30.5.50 2350-0045
0	8·39	35·26	27·44	65		
10	·40	·25	·43	66	·0066	
20	·40	·22	·40	70	·0134	
30	·40	·17	·36	74	·0206	
50	·32	·21	·41	69	·0349	
75	·02	·18	·43	68	·0520	
100	7·89	·25	·51	61	·0681	
150	·76	·25	·53	60	·0983	
200	·38	·17	·53	60	·1283	
300	5·68	·12	·71	44	·1803	
[385]				30	·2117	45·3604
400	2·53	34·90	·87	27	·2158	48·5054
[500]	0·85	·90	28·00	13		
NNE. 4.			63°06′N 6°35′W 1097 m.			29.5.50 2050-2125
0	8·50	35·20	27·37	72		
10	·45	·22	·40	69	·0070	
20	·29	·18	·39	70	·0140	
30	·26	·18	·39	71	·0210	
50	·20	·18	·40	70	·0351	
75	7·92	·17	·44	67	·0522	
100	8·22	·18	·40	71	·0694	
150	7·62	·21	·52	60	·1022	
200	·31	·16	·53	60	·1322	
300	6·82	·13	·57	58	·1912	
[385]				39	·2324	47·8102
400	4·65	·09	·80	36	·2382	
[480]				22	·2614	71·2612
[500]	2·21	34·99	·97	18		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
NNE. 3.			62°55′N 6°35′W			29.5.50
			549 m.			1835-1920
0	8·50	35·20	27·37	72		
10	·29	·21	·41	68	·0070	
20	·25	·24	·44	66	·0137	
30	·21	·22	·43	67	·0203	
50	·18	·22	·44	66	·0336	
75	·03	·19	·44	67	·0502	
100	7·77	·20	·49	62	·0663	
150	8·21	·24	·44	68	·0988	
200	7·48	·21	·54	59	·1306	
300	·12	·19	·58	57	·1886	
[330]				56	·2056	35·0867
400	6·06	·09	·64	52	·2431	
[480]				40	·2799	71·6787
500	3·95	34·97	·79	37		
NNE. 2-3.			62°43′N 6°35′W			29.5.50
			183 m.			1600-1700
0	8·39	35·23	27·41	68		
10	·39	·19	·38	71	·0070	
20	·31	·20	·40	70	·0140	
30	·27	·23	·42	68	·0209	
50	·12	·24	·46	64	·0341	
75	·01	·19	·44	67	·0505	
100	7·92	·23	·49	62	·0666	
[135]				63	·0885	6·1000
150	·89	·22	·49	63	·0978	
175	·86	·22	·49	64	·1137	
[200]				59	·1291	
[300]				57	·1871	
[330]				56	·2041	34·8526
Var. 0-1			62°32′N 6°35′W			29.5.50
			86 m.			1415-1430
0	7·91	35·16	27·43	66		
10	·76	·19	·49	61	·0064	
20	·75	·24	·52	58	·0124	
30	·75	·24	·52	58	·0182	
50	·72	·21	·50	61	·0301	
80	·71	·20	·50	61	·0484	
[100]				61	·0606	
[135]				61	·0820	5·5250

VOLUME TRANSPORT

		Km³/hr
63°30′N 6°35′W.	$\Delta Q = \cdot1946 \times 400 - 39\cdot4523 = 38\cdot3877$	+0·16
63°18½N 6°35′W.	$\Delta Q = \cdot2158 \times 400 - 48\cdot5054 = 37\cdot8146$	
”	$\Delta Q = \cdot2117 \times 385 - 45\cdot3604 = 36\cdot1441$	−1·52
63°06′N 6°35′W.	$\Delta Q = \cdot2324 \times 385 - 47\cdot8102 = 41\cdot6638$	
”	$\Delta Q = \cdot2614 \times 480 - 71\cdot2612 = 54\cdot2108$	−2·35
62°55′N 6°35′W.	$\Delta Q = \cdot2799 \times 480 - 71\cdot6787 = 62\cdot6733$	
”	$\Delta Q = \cdot2056 \times 330 - 35\cdot0867 = 32\cdot7613$	+0·07
62°43′N 6°35′W.	$\Delta Q = \cdot2041 \times 330 - 34\cdot8526 = 32\cdot5004$	
”	$\Delta Q = \cdot0885 \times 135 - 6\cdot1000 = 5\cdot8475$	+0·08
62°32′N 6°35′W.	$\Delta Q = \cdot0820 \times 135 - 5\cdot5250 = 5\cdot5450$	
		−3·56

NOLSØ, FAROE—FLUGGA, SHETLAND

Danish Research Vessel, *DANA*
31 May-1 June, 1950

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SW. 2.			62°00′N 6°12′W			1.6.50
			122 m.			1940-1955
0	7·99	35·23	27·47	62		
10	·94	·24	·49	61	·0062	
20	·80	·25	·53	57	·0121	
50	·71	·23	·53	58	·0293	
75	·70	·24	·53	58	·0438	
115	·68	·23	·53	59	·0672	
[200]				55	·1156	11·6463
SSW. 2.			61°54½′N 5°45′W			1.6.50
			282 m.			1630-1650
0	8·28	35·25	27·44	65		
10	·15	·25	·46	64	·0064	
20	·10	·25	·47	63	·0128	
50	7·95	·25	·50	61	·0314	
75	·62	·25	·56	55	·0459	
100	·08	·21	·60	52	·0593	
150	6·99	·21	·61	52	·0853	
200	·96	·21	·62	52	·1113	11·6022
[230]				52	·1269	15·1752
275	·93	·21	·62	53		
WSW. 3.			61°49′N 5°21′W			1.6.50
			174 m.			1250-1305
0	8·30	35·20	27·40	69		
10	·23	·21	·42	67	·0068	
20	·18	·23	·44	66	·0134	
50	7·69	·23	·52	59	·0322	
75	·24	·21	·58	53	·0462	
100	·20	·22	·59	53	·0594	
150	·14	·20	·58	55	·0864	
170	·14	·21	·59	54	·0973	
[200]				53	·1133	
[230]				52	·1291	15·3960
[290]				51	·1600	24·0690
SSW. 4.			61°42½N 4°51′W			1.6.50
			460 m.			0930-1000
0	8·90	35·35	27·43	66		
10	·85	·35	·43	66	·0066	
20	·76	·34	·44	66	·0132	
50	·04	·28	·50	61	·0322	
75	7·76	·24	·52	59	·0472	
100	·42	·23	·57	55	·0614	
150	·22	·18	·56	57	·0894	
200	6·90	·19	·60	53	·1169	
[290]				50	·1633	24·6995
300	·38	·16	·65	50	·1684	
400	4·36	·01	·78	37	·2119	
440	3·58	34·98	·84	31		
[445]				30	·2270	55·2457
SSW. 4.			61°35′N 4°15′W			1.6.50
			1200 m.			0515-0605
0	8·70	35·28	27·40	69		
10	·68	·32	·44	66	·0068	
20	·67	·31	·43	67	·0134	
50	·39	·30	·47	63	·0329	
75	7·94	·30	·54	57	·0479	
100	·62	·27	·57	55	·0619	
150	·32	·25	·60	53	·0889	
200	·07	·23	·62	52	·1151	
300	6·38	·18	·67	48	·1651	
400	4·48	·06	·80	36	·2071	
[445]				27	·2213	54·3410
[480]				21	·2299	62·1820
500	2·06	34·98	·98	17		
SSW. 4.			61°28′N 3°42′W			1.6.50
			1310 m.			0235-0300
0	8·63	35·32	27·44	65		
10	·62	·32	·44	66	·0066	
20	·60	·30	·43	67	·0132	
50	·42	·31	·47	63	·0327	
75	7·68	·32	·60	51	·0469	
100	·48	·25	·57	55	·0601	
150	·24	·26	·62	51	·0866	
200	·01	·22	·61	53	·1126	
300	6·53	·21	·67	48	·1631	
400	5·02	·09	·77	39	·2066	
[440]				32	·2208	52·6185
[480]				25	·2322	61·6225
500	2·55	34·98	·94	21		

S. 4. 61°21′N 3°10′W 31.5/1.6.50
1220 m. 2315-0010

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	8·65	35·35	27·46	63		
10	·63	·34	·46	64	·0064	
20	·63	·34	·46	64	·0128	
50	·56	·32	·46	64	·0320	
75	7·68	·28	·58	53	·0466	
100	·35	·26	·60	52	·0597	
150	·10	·26	·64	49	·0849	
200	6·90	·25	·66	48	·1091	
300	5·85	·16	·72	43	·1546	
[385]				31	·1860	39·2368
400	3·38	34·99	·86	29	·1906	
[440]				23	·2010	49·8533
500	1·67	·96	·99	15		

S. 4. 61°14′N 2°40′W 31.5.50
1105 m. -2020

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	8·47	35·31	27·46	63		
10	·45	·30	·46	64	·0064	
20	·44	·28	·44	66	·0129	
50	7·74	·26	·54	57	·0313	
75	·39	·25	·59	52	·0449	
100	·18	·25	·62	50	·0577	
150	6·94	·23	·63	50	·0827	
200	·60	·20	·66	48	·1072	
300	4·51	·05	·79	36	·1492	
[385]				23	·1743	37·8528
400	2·62	34·99	·94	21	·1777	
[470]				13	·1896	53·3045
500	0·60	·92	28·03	10		

Var. 1-2. 61°08′N 2°10′W 31.5.50
570 m. 1340-1420

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	9·30	35·32	27·33	76		
10	·27	·33	·35	74	·0075	
20	·17	·33	·37	72	·0148	
30	·17	·33	·37	73	·0220	
50	·10	·34	·39	71	·0364	
75	8·99	·34	·41	70	·0540	
100	9·03	·34	·40	71	·0716	
150	7·95	·26	·42	70	·1068	
200	·54	·24	·55	58	·1388	
300	6·92	·21	·62	53	·1973	
[355]				51	·2259	42·6600
400	·19	·16	·68	49	·2483	
[470]				41	·2798	71·7855
500	4·65	·08	·80	37		

Var. 1-2. 61°01′N 1°36′W 31.5.50
152 m. 1050-1110

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	9·53	35·29	27·27	81		
10	·34	·31	·32	77	·0079	
20	·32	·30	·32	77	·0156	
30	·32	·28	·30	79	·0234	
50	·30	·28	·31	79	·0392	
75	8·96	·32	·39	72	·0581	
100	·86	·34	·43	68	·0756	
[130]				66	·0957	6·4349
145	·58	·34	·47	65	·1055	
[200]				63	·1407	
[300]				57	·2007	
[355]				54	·2312	43·6359

Var. 1-2. 60°53′N 1°06′W 31.5.50
103 m. 0840-0902

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	9·20	35·33	27·36	73		
10	·14	·34	·38	71	·0072	
20	·12	·34	·38	71	·0143	
30	·09	·34	·39	71	·0214	
50	8·72	·33	·44	66	·0351	
75	·22	·33	·52	59	·0507	
95	·21	·34	·53	59	·0625	
[130]				62	·0837	5·6500

VOLUME TRANSPORT

		Km³/hr.
62°00′N 6°12′W.	$\Delta Q = {\cdot}1156 \times 200 - 11{\cdot}6463 = 11{\cdot}4737$	+0·23
61°54½′N 5°45′W.	$\Delta Q = {\cdot}1113 \times 200 - 11{\cdot}6022 = 10{\cdot}6578$	
”	$\Delta Q = {\cdot}1269 \times 230 - 15{\cdot}1752 = 14{\cdot}0118$	−0·08
61°49′N 5°21′W.	$\Delta Q = {\cdot}1291 \times 230 - 15{\cdot}3960 = 14{\cdot}2970$	
”	$\Delta Q = {\cdot}1600 \times 290 - 24{\cdot}0690 = 22{\cdot}3310$	−0·09
61°42½′N 4°51′W.	$\Delta Q = {\cdot}1633 \times 290 - 24{\cdot}6995 = 22{\cdot}6575$	
”	$\Delta Q = {\cdot}2270 \times 445 - 55{\cdot}2457 = 45{\cdot}7693$	+0·46
61°35′N 4°15′W.	$\Delta Q = {\cdot}2213 \times 445 - 54.3410 = 44{\cdot}1375$	
”	$\Delta Q = {\cdot}2299 \times 480 - 62{\cdot}1820 = 48{\cdot}1700$	−0·47
61°28′N 3°42′W.	$\Delta Q = {\cdot}2322 \times 480 - 61{\cdot}6225 = 49{\cdot}8335$	
”	$\Delta Q = {\cdot}2208 \times 440 - 52{\cdot}6185 = 44{\cdot}5335$	+1·67
61°21′N 3°10′W.	$\Delta Q = {\cdot}2010 \times 440 - 49{\cdot}8533 = 38{\cdot}5867$	
”	$\Delta Q = {\cdot}1860 \times 385 - 39{\cdot}2368 = 32{\cdot}3732$	+0·88
61°14′N 2°40′W.	$\Delta Q = {\cdot}1743 \times 385 - 37{\cdot}8528 = 29{\cdot}2527$	
”	$\Delta Q = {\cdot}1896 \times 470 - 53{\cdot}3045 = 35{\cdot}8075$	−6·74
61°08′N 2°10′W.	$\Delta Q = {\cdot}2798 \times 470 - 71{\cdot}7855 = 59{\cdot}7205$	
”	$\Delta Q = {\cdot}2259 \times 355 - 42{\cdot}6600 = 37{\cdot}5345$	−0·26
61°01′N 1°36′W.	$\Delta Q = {\cdot}2312 \times 355 - 43{\cdot}6359 = 38{\cdot}4401$	
”	$\Delta Q = {\cdot}0957 \times 130 - 6{\cdot}4349 = 6{\cdot}0061$	+0·22
60°53′N 1°06′W.	$\Delta Q = {\cdot}0837 \times 130 - 5{\cdot}6500 = 5{\cdot}2310$	
		−4·18

FAROE BANK—BUTT OF LEWIS

F.R.S. *SCOTIA*

16-17 June, 1950

WSW. 3. 60°54′N 8°16′W 17.6.50
165 m. 1305-1340

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	9·71	35·26	27·22	86		
10	·68	·27	·23	85	·0086	
20	·43	·25	·26	83	·0170	
30	·35	·28	·30	79	·0251	
50	·31	·27	·30	80	·0410	
75	8·91	·25	·34	76	·0605	
100	·84	·27	·37	74	·0793	
125	·77	·25	·37	74	·0978	
160	·75	·27	·39	73	·1235	
[200]				73	·1527	
[300]				74	·2262	
[400]				70	·2982	
[500]				50	·3582	
[550]				40	·3807	112·1269

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
WNW. 2.			60°45′N 8°08′W 838 m.			17.6.50 1115-1155
0	9·52	35·32	27·30	79		
10	·49	·30	·29	80	·0080	
20	·48	·32	·31	78	·0159	
30	·48	·32	·31	78	·0237	
50	·49	·30	·29	81	·0396	
75	·49	·30	·29	81	·0598	
100	·13	·32	·36	75	·0793	
150	·04	·32	·38	74	·1165	
200	8·98	·32	·39	74	·1535	
300	·77	·32	·43	72	·2265	
400	·05	·29	·51	66	·2955	
[500]	5·67	·14	·74	44	·3505	
[550]				34	·3700	111·0293
600	2·89	34·99	·92	24		
WNW. 2.			60°35′N 8°00′W 923 m.			17.6.50 0835-1000
0	9·80	35·26	27·20	88		
10	·81	·32	·25	84	·0086	
20	·53	·32	·30	79	·0168	
30	·42	·32	·32	77	·0246	
50	·75	·32	·26	83	·0406	
75	8·95	·31	·39	72	·0600	
100	·39	·31	·47	64	·0770	
150	·12	·30	·51	62	·1085	
200	7·66	·28	·57	57	·1383	
300	6·53	·20	·66	49	·1913	
400	5·12	·11	·78	38	·2348	
[500]	3·33	·03	·89	27	·2673	
[550]				15	·2778	91·3240
600	–0·26	34·94	28·09	3		
N. 1.			60°23½′N 7°49½′W 842 m.			17.6.50 0610-0730
0	10·44	35·31	27·13	95		
10	·36	·33	·16	92	·0094	
20	·23	·34	·19	90	·0185	
30	·24	·30	·16	93	·0277	
50	·54	·30	·10	99	·0469	
75	·30	·31	·16	94	·0710	
100	9·29	·26	·29	82	·0930	
150	8·86	·28	·38	74	·1320	
200	·75	·26	·37	76	·1695	
300	·69	·26	·39	76	·2455	
400	7·56	·23	·55	62	·3145	
[500]	4·61	·12	·84	34	·3625	
[550]				19	·3757	118·9048
600	–0·16	34·94	28·09	4		
Calm.			60°12′N 7°40′W 591 m.			17.6.50 0310-0530
0	10·51	35·36	27·16	92		
10	·28	·37	·21	87	0090	
20	·19	·36	·22	87	·0177	
30	·17	·37	·23	86	·0263	
50	·16	·37	·23	86	·0435	
75	9·90	·38	·28	82	·0645	
100	·59	·38	·34	77	·0844	
150	·11	·36	·40	72	·1216	
200	·07	·36	·41	72	·1576	
300	·03	·31	·38	77	·2321	
400	8·92	·33	·41	76	·3086	
[500]	·72	·32	·43	76	·3846	
[550]				77	·4228	117·8027
560	·66	·31	·43	77		

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
Calm.			59°56′N 7°27′W 776 m.			16/17.6.50 2355-0058
0	10·77	35·26	27·03	104		
10	·73	·37	·12	96	·0100	
20	·63	·32	·11	97	·0196	
30	·49	·35	·16	93	·0291	
50	·43	·37	·18	91	·0475	
75	9·84	·36	·28	82	·0691	
100	·57	·37	·33	78	·0891	
150	·46	·37	·35	77	·1279	
200	·36	·34	·34	79	·1669	
300	·15	·30	·35	80	·2464	
400	·06	·28	·35	82	·3274	
[500]	8·98	·30	·38	81	·4089	
[550]				81	·4494	125·0650
600	·86	·32	·41	80		
N. 1.			59°44′N 7°15′W 929m.			16.6.50 2130-
0	10·79	35·32	27·08	99		
10	·59	·34	·13	95	·0097	
20	·41	·31	·14	94	·0191	
30	·74	·37	·12	96	·0286	
50	·78	·37	·12	97	·0479	
75	·72	·37	·13	97	·0721	
100	·70	·37	·13	97	·0963	
150	9·70	·37	·31	81	·1408	
200	·38	·37	·36	77	·1803	
300	·12	·37	·40	75	·2563	
400	·00	·35	·41	76	·3318	
[500]	8·85	·32	·41	78	·4088	
[550]				78	·4478	128·4360
600	·57	·28	·43	78		
N. 1.			59°31′N 7°05′W 1005 m.			16.6.50 1915-2000
0	10·99	35·39	27·10	98		
10	·67	·39	·15	93	·0096	
20	·61	·40	·17	91	·0188	
30	·42	·38	·19	90	·0278	
50	·34	·39	·21	88	·0456	
75	9·66	·39	·33	77	·0662	
100	·48	·39	·36	75	·0852	
150	·33	·37	·37	75	·1227	
200	·15	·34	·38	75	·1602	
300	·08	·36	·40	75	·2352	
400	8·98	·32	·39	78	·3117	
[500]	·86	·30	·40	79	·3902	
[550]				79	·4297	119·4245
600	·75	·31	·42	79		
NNE. 1.			59°17′N 6°53′W 597 m.			16.6.50 1645-1740
0	10·95	35·42	27·12	96		
10	·83	·39	·12	96	·0096	
20	·61	·39	·16	92	·0190	
30	·60	·43	·20	89	·0280	
50	·58	·42	·20	89	·0458	
75	·04	·39	·27	83	·0673	
100	·00	·39	·27	84	·0882	
150	9·78	·40	·32	80	·1292	
200	·61	·41	·35	78	·1687	
300	·46	·38	·35	80	·2477	
370				79	·3033	57·5091
400	·25	·36	·38	79	·3272	
[500]	·15	·36	·39	80	·4067	
[550]				80	·4467	124·9991
580	·06	·36	·41	80		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
N/W. 2.			59°00′N 6°40′W			16.6.50
			139 m.			1317-1400
0	10·79	35·19	26·98	109		
10	·57	·17	27·00	107	·0108	
20	·51	·18	·02	106	·0214	
30	·40	·35	·17	92	·0313	
50	·47	·37	·17	92	·0497	
75	9·50	·36	·33	77	·0708	
100	·35	·37	·37	74	·0897	
[125]				72	·1079	7·2709
130	·10	·36	·40	72		
[150]				71	·1259	
[200]				75	·1624	
[300]				77	·2384	
[370]				78	·2926	56·0234
N. 2.			58°50′N 6°26′W			16.6.50
			106 m.			1110-1155
0	10·71	35·15	26·96	111		
10	·60	·19	27·01	106	·0108	
20	·30	·25	·11	97	·0210	
30	9·68	·22	·20	89	·0303	
50	·01	·24	·32	78	·0470	
75	·18	·32	·36	75	·0661	
[95]				73	·0809	4·1263
100	·00	·31	·38	73	·0846	
[125]				72	·1027	6·8813
NW. 3.			58°33′N 6°10′W			16.6.50
			86 m.			0825-0950
0	10·39	34·88	26·81	125		
10	·39	·88	·81	125	·0125	
20	·39	·88	·81	126	·0251	
30	·37	·90	·83	124	·0376	
50	9·70	35·04	27·05	103	·0603	
80	8·94	·24	·33	77	·0873	
[95]				75	·0987	5·1520

VOLUME TRANSPORT

			Km³/hr
60°54′N	8°16′W.	ΔQ=·3807×550−112·1269= 97·2581	+1·35
60°45′N	8°08′W.	ΔQ=·3700×550−111·0293= 92·4707	+8·78
60°35′N	8°00′W.	ΔQ=·2778×550− 91·3240= 61·4660	−7·45
60°23½′N	7°49½′W.	ΔQ=·3757×550−118·9048= 87·7302	−7·67
60°12′N	7°40′W.	ΔQ=·4228×550−117·8027=114·7373	−2·10
59°56′N	7°27′W.	ΔQ=·4494×550−125·0650=122·1050	+1·21
59°44′N	7°15′W.	ΔQ=·4478×550−128·4360=117·8540	+0·27
59°31′N	7°05′W.	ΔQ=·4297×550−119·4245=116·9105	−1·08
59°17′N	6°53′W.	ΔQ=·4467×550−124·9991=120·6859	
″		ΔQ=·3033×370− 57·5091= 54·7119	+0·71
59°00′N	6°40′W.	ΔQ=·2926×370− 56·0234= 52·2386	
″		ΔQ=·1079×125− 7·2709= 6·2166	+0·08
58°50′N	6°26′W.	ΔQ=·1027×125− 6·8813= 5·9562	
″		ΔQ=·0809× 95− 4·1263= 3·5592	−0·19
58°33′N	6°10′W.	ΔQ=·0987× 95− 5·1520= 4·2245	
			−6·09

VIDERØ, FAROE, NORTHWARD ON LONGITUDE 6°35′W TO LATITUDE 63°30′N

F.R.S. *SCOTIA*
19 June, 1950

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
W. 2.			63°30′N 6°35′W			19.6.50
			1450 m.			1555-1715
0	9·02	35·17	27·27	81		
10	·01	·17	·27	82	·0082	
20	8·94	·16	·27	82	·0164	
30	·81	·17	·30	79	·0244	
50	·27	·17	·39	71	·0394	
75	·03	·17	·42	69	·0569	
100	7·72	·17	·48	63	·0734	
150	·74	·21	·50	62	·1046	
200	·71	·17	·48	65	·1364	
300	4·48	·05	·79	35	·1864	30·4536
400	1·62	34·92	·96			
W. 1-2.			63°18½′N 6°35′W			19.6.50
			1358 m.			1345-1440
0	8·83	35·19	27·31	78		
10	·81	·19	·32	77	·0078	
20	·73	·16	·31	78	·0156	
30	·71	·16	·31	78	·0234	
50	·43	·17	·36	74	·0386	
75	7·87	·18	·45	66	·0561	
100	·74	·16	·47	64	·0723	
150	·38	·14	·50	62	·1038	
200	6·41	·17	·66	48	·1313	
[205]				46	·1337	14·7023
300	1·08	34·89	·98	15	·1628	28·7448
400	0·27	·91	28·04			
W. 2.			63°06′N 6°35′W			19.6.50
			1196 m.			1040-1225
0	8·78	35·17	27·31	78		
10	·76	·17	·31	78	·0078	
20	·76	·17	·32	77	·0156	
30	·48	·16	·34	75	·0232	
50	7·19	·16	·55	56	·0363	
75	6·03	·10	·65	47	·0492	
100	5·68	·12	·71	41	·0712	
150	3·72	·00	·84	29	·0887	
200	2·24	34·92	·92	21	·1012	
[205]				20	·1022	12·7723
[230]				18	·1070	15·3868
300	0·68	·92	28·03	10		
NW. 1.			62°55′N 6°35′W			19.6.50
			677 m.			0820-0930
0	8·76	35·20	27·33	76		
10	·76	·21	·34	75	·0076	
20	·42	·20	·38	71	·0149	
30	·38	·17	·37	73	·0221	
50	·09	·19	·43	67	·0361	
75	7·72	·19	·49	62	·0522	
100	·56	·19	·51	60	·0674	
150	·34	·19	·54	58	·0969	
200	·05	·18	·58	55	·1251	
[230]				49	·1407	17·1608
[295]				35	·1679	27·0913
300	4·15	·01	·80	34		

N. 2. 62°43′N 6°35′W 19.6.50
183 m. 0635-0700

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·17	35·24	27·30	79		
10	·17	·22	·28	81	·0080	
20	·14	·22	·29	80	·0160	
30	·12	·22	·29	80	·0240	
50	8·82	·25	·36	74	·0394	
75	·54	·25	·40	71	·0575	
100	·19	·24	·45	66	·0746	
[135]				65	·0975	6·8682
150	·19	·26	·47	65	·1074	
175	·19	·28	·48	65	·1236	
[200]				63	·1396	
[295]				56	·1961	30·5297

NW. 3. 62°32′N 6°35′W 19.6.50
88 m. 0325-0430

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·23	35·17	27·39	70		
10	·23	·16	·38	71	·0070	
20	·23	·15	·37	72	·0142	
30	·23	·18	·40	70	·0213	
50	·23	·19	·40	70	·0353	
85	·24	·18	·39	72	·0601	
[135]				68	·0951	6·4340

Volume Transport

		Km³/hr.
63°30′N 6°35′W.	ΔQ=·1864×300−30·4536=25·4664	+1·48
63°18½′N 6°35′W.	ΔQ=·1628×300−28·7448=20·0952	
"	ΔQ=·1337×205−14·7023=12·7062	+1·25
63°06′N 6°35′W.	ΔQ=·1022×205−12·7723= 8·1787	
"	ΔQ=·1070×230−15·3868= 9·2232	−1·66
62°55′N 6°35′W.	ΔQ=·1407×230−17·1608=15·2002	
"	ΔQ=·1679×295−27·0913=22·4392	−1·35
62°43′N 6°35′W.	ΔQ=·1961×295−30·5297=27·3198	
"	ΔQ=·0975×135− 6·8682= 6·2943	−0·03
62°32′N 6°35′W.	ΔQ=·0951×135− 6·4340= 6·4045	
		−0·31

NOLSØ, FAROE—FLUGGA, SHETLAND

F.R.S. *SCOTIA*

27-29 June, 1950

S. 3. 62°00′N 6°12′ W 27.6.50
110 m. 1828-1910

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·50	35·16	27·18	90		
10	·11	·16	·24	84	·0087	
20	8·67	·18	·33	76	·0167	
30	·51	·17	·35	74	·0242	
50	·43	·17	·36	74	·0390	
75	·35	·17	·37	73	·0574	
[100]	·33	·17	·37	74	·0758	
105	·33	·17	·37	74		
[150]				69	·1116	
[190]				68	·1390	13·5740

S. 3-4. 61°54′N 5°45′W 27.6.50
267 m. 2045-2118

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·65	35·15	27·15	93		
10	·62	·15	·15	93	·0093	
20	·42	·14	·18	90	·0185	
30	·32	·15	·20	89	·0275	
50	8·67	·16	·31	79	·0443	
75	·26	·15	·37	73	·0633	
100	7·93	·17	·43	68	·0809	
150	·90	·16	·44	68	·1149	
[190]				69	·1423	14·3200
200	·88	·15	·44	69	·1491	
[225]				66	·1660	19·7148
260	·23	·14	·52	62		

SSW. 3. 61°49′N 5°21′W 27/28.6.50
183 m. 2355-0045

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·67	35·16	27·15	93		
10	·66	·14	·14	94	·0094	
20	·51	·14	·16	92	·0187	
30	·42	·15	·18	91	·0279	
50	8·53	·16	·33	77	·0447	
75	·39	·18	·37	73	·0635	
100	7·89	·19	·48	63	·0805	
150	·88	·17	·46	66	·1127	
180	·64	·17	·49	64		
[200]				58	·1437	
[210]				53	·1493	17·0040
[225]				45	·1566	19·2928

S. 2. 61°42′N 4°51′W 28.6.50
238 m. 0240-0345

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·12	35·17	27·25	83		
10	·12	·19	·27	82	·0082	
20	·06	·17	·26	83	·0164	
30	8·38	·19	·38	72	·0242	
50	·17	·25	·46	64	·0378	
75	7·86	·23	·51	60	·0533	
100	·73	·23	·52	59	·0682	
150	·48	·22	·54	58	·0974	
200	6·57	·22	·68	46	·1234	
[210]				43	·1278	14·5606
230	5·64	·19	·78	36		
[270]				27	·1490	22·8386

S. 2. 61°35′N 4°15′W 28.6.50
787 m. 0535-0635

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·89	35·20	27·14	94		
10	·87	·21	·15	93	·0094	
20	·78	·20	·16	92	·0186	
30	·74	·20	·17	92	·0278	
50	8·35	·21	·40	70	·0440	
75	·13	·30	·51	60	·0602	
100	7·92	·26	·52	60	·0752	
150	·15	·21	·60	53	·1034	
200	5·62	·14	·74	40	·1266	
[270]				27	·1500	24·0280
300	2·45	34·95	·92	22	·1576	
[315]				21	·1608	30·9450
400	0·83	·89	28·00	13		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
S. 1-2.			61°26′N 3°42′W			28.6.50
			1196 m.			0825-0910
0	10·52	35·25	27·07	100		
10	·48	·23	·07	101	·0100	
20	·10	·23	·13	95	·0198	
30	8·36	·23	·42	68	·0280	
50	7·95	·22	·48	62	·0410	
75	·83	·22	·50	61	·0564	
100	·61	·21	·52	59	·0714	
150	·14	·21	·59	54	·0996	
200	·06	·21	·61	53	·1264	
300	5·82	·12	·69	46	·1759	
[315]				41	·1824	31·6702
[380]				20	·2023	44·1110
400	1·07	34·91	28·00	13		
S. 1.			61°21′N 3°10′W			28.6.50
			1380 m.			1120-1325
0	10·77	35·22	27·01	106		
10	·60	·22	·04	103	·0104	
20	·32	·22	·09	99	·0205	
30	·22	·23	·11	97	·0303	
50	9·01	·23	·31	79	·0479	
75	8·15	·24	·46	65	·0659	
100	·25	·22	·43	68	·0825	
150	7·44	·22	·55	58	·1140	
200	·13	·23	·61	53	·1418	
300	6·38	·21	·70	45	·1908	
[380]				36	·2232	49·0175
400	4·58	·00	·75	40		
Calm			61°14′N 2°40′W			28.6.50
			1079 m.			1520-1620
0	11·23	35·25	26·94	113		
10	10·66	·25	27·05	102	·0108	
20	·60	·26	·07	101	·0210	
30	·52	·30	·11	97	·0309	
50	9·41	·30	·30	80	·0486	
75	8·91	·30	·38	73	·0677	
100	7·25	·26	·62	50	·0831	
150	·12	·29	·66	47	·1073	
200	6·35	·19	·68	46	·1305	
300	4·88	·07	·78	37	·1720	
[380]				30	·1988	45·2683
400	3·18	34·96	·87	28	·2045	
[440]				24	·2149	57·6493
600	0·12	·90	28·04	9		
S. 1.			61°08′N 2°10′W			28.6.50
			556 m.			1750-
0	11·44	35·25	26·90	117		
10	10·86	·25	27·01	106	·0112	
20	·74	·26	·04	104	·0217	
30	·22	·25	·13	95	·0317	
50	9·38	·28	·29	81	·0493	
75	·29	·37	·38	73	·0685	
100	·32	·35	·36	75	·0870	
150	8·69	·35	·46	66	·1222	
200	·18	·31	·51	62	·1542	
300	7·57	·26	·57	58	·2142	
[335]				57	·2343	43·1226
400	6·92	·22	·63	54	·2702	
[440]				43	·2896	70·6898
520	2·86	34·99	·91	22		
SSE. 1.			61°01′N 1°36′W			28.6.50
			157 m.			2030-2115
0	11·72	35·28	26·87	119		
10	·12	·28	·99	108	·0114	
20	·02	·31	27·03	105	·0220	
30	10·56	·35	·14	94	·0320	
50	9·68	·38	·32	78	·0492	
75	·26	·40	·40	71	·0678	
100	8·95	·41	·46	66	·0849	
[130]				67	·1049	7·5243
150	·79	·36	·45	67	·1181	
[200]				66	·1513	
[300]				62	·2153	
[335]				59	·2365	42·7238
ESE. 1.			60°56′N 1°00′W			29.6.50
			102 m.			0025-0120
0	11·69	35·35	26·94	113		
10	·32	·35	27·00	107	·0110	
20	·01	·35	·06	102	·0214	
30	10·03	·35	·24	85	·0308	
50	9·40	·39	·37	73	·0466	
75	8·72	·37	·47	64	·0637	
98	·70	·36	·46	65		
[100]				65	·0798	
[130]				66	·0994	7·1126

VOLUME TRANSPORT

		Km³/hr.
62°00′N 6°12′W.	$\Delta Q=\cdot1390\times190-13{\cdot}5740=12{\cdot}8360$	+0·03
61°54′N 5°45′W.	$\Delta Q=\cdot1423\times190-14{\cdot}3200=12{\cdot}7170$	
”	$\Delta Q=\cdot1660\times225-19{\cdot}7148=17{\cdot}6352$	+0·47
61°49′N 5°21′W.	$\Delta Q=\cdot1566\times225-19{\cdot}2928=15{\cdot}9422$	
”	$\Delta Q=\cdot1493\times210-17{\cdot}0040=14{\cdot}3490$	+0·58
61°42′N 4°51′W.	$\Delta Q=\cdot1278\times210-14{\cdot}5606=12{\cdot}2774$	
”	$\Delta Q=\cdot1490\times270-22{\cdot}8386=17{\cdot}3914$	+0·26
61°35′N 4°15′W.	$\Delta Q=\cdot1500\times270-24{\cdot}0280=16{\cdot}4720$	
”	$\Delta Q=\cdot1608\times315-30{\cdot}9450=19{\cdot}7070$	−1·71
61°26′N 3°42′W.	$\Delta Q=\cdot1824\times315-31{\cdot}6702=25{\cdot}7858$	
”	$\Delta Q=\cdot2023\times380-44{\cdot}1110=32{\cdot}7630$	−0·85
61°21′N 3°10′W.	$\Delta Q=\cdot2232\times380-49{\cdot}0175=35{\cdot}7985$	
61°14′N 2°40′W.	$\Delta Q=\cdot1988\times380-45{\cdot}2683=30{\cdot}2757$	+1·55
”	$\Delta Q=\cdot2149\times440-57{\cdot}6493=36{\cdot}9067$	−5·59
61°08′N 2°10′W.	$\Delta Q=\cdot2896\times440-70{\cdot}6898=56{\cdot}7342$	
”	$\Delta Q=\cdot2343\times335-43{\cdot}1226=35{\cdot}3679$	−0·32
61°01′N 1°36′W.	$\Delta Q=\cdot2365\times335-42{\cdot}7238=36{\cdot}5037$	
”	$\Delta Q=\cdot1049\times130-7{\cdot}5243=6{\cdot}1127$	+0·09
60°56′N 1°00′W.	$\Delta Q=\cdot0994\times130-7{\cdot}1126=5{\cdot}8094$	
		−5·49

FAROE BANK—BUTT OF LEWIS

F.R.S. *EXPLORER*

19-21 July, 1950

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
SW. 3.			60°54′N 8°16′W			21.7.50
			113 m.			0815-0835
0	10·86	35·17	26·95	112		
10	·75	·19	·98	109	·0110	
20	·48	·18	27·02	106	·0218	
30	·18	·18	·08	100	·0321	
50	9·83	·21	·16	93	·0514	
75	·80	·19	·15	94	·0748	2·9010
108	·79	·18	·14	96	·1062	
[165]				84	·1575	13·4029

S. 3. 60°45′N 8°08′W 21.7.50
220 m. 0335-0450

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·13	35·19	26·92	115		
10	·12	·19	·92	115	·0115	
20	·07	·19	·93	114	·0229	
30	10·77	·18	·97	111	·0341	
50	·03	·24	27·15	94	·0546	
75	9·65	·20	·18	92	·0778	
100	·20	·21	·27	83	·0997	
150	·19	·21	·27	85	·1417	
[165]	·20	·21	·27	85	·1545	13·5318
200	·21	·21	·26	86	·1844	
215	8·61	·19	·34	79	·1968	
[300]				75	·2622	
[400]				72	·3357	
[500]				68	·4057	
[550]				50	·4352	129·8066

SSW. 4. 60°35′N 8°00′W 21.7.50
878 m. 0140-0230

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·42	35·24	26·90	117		
10	·34	·25	·92	115	·0116	
20	·24	·26	·95	112	·0230	
30	·23	·25	·94	113	·0342	
50	10·74	·26	27·04	104	·0559	
75	·15	·32	·19	91	·0803	
100	·40	·32	·15	95	·1035	
150	·23	·34	·19	92	·1503	
200	9·16	·32	·36	77	·1925	
[300]	8·46	·27	·43	72	·2670	
400	·19	·23	·44	73	·3395	
[500]	7·24	·14	·52	66	·4090	
[550]	4·75	·05	·76	41	·4358	132·1780
600	1·75	34·96	·99	14		

SW. 3. 60°23½′N 7°49½′W 20.7.50
870 m. 2240-0010

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·76	35·14	26·94	113		
10	·64	·24	27·04	103	·0108	
20	·47	·23	·07	101	·0210	
30	·15	·21	·11	97	·0309	
50	·25	·22	·10	99	·0505	
75	·25	·21	·09	100	·0754	
100	9·67	·22	·20	90	·0992	
150	8·80	·22	·34	78	·1412	
200	·35	·26	·44	69	·1780	
[300]	7·68	·25	·54	61	·2430	
400	·19	·23	·60	57	·3020	
[500]	4·20	·06	·84	32	·3465	
[550]	1·13	34·94	28·01	13	·3577	117·3628
600	0·63	·90	·01	12		

SSW. 4. 60°12′N 7°40′W 20.7.50
545 m. 1950-2120

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	12·38	35·19	26·68	137		
10	·37	·19	·68	138	·0138	
20	·09	·23	·77	129	·0272	
30	10·74	·23	27·01	107	·0390	
50	9·75	·28	·23	86	·0583	
75	·85	·28	·21	89	·0802	
100	·38	·28	·29	82	·1016	
150	·12	·28	·33	79	·1418	
200	·04	·28	·34	79	·1813	
[300]	8·95	·27	·36	79	·2603	
400	·70	·23	·36	81	·3403	
[500]	7·27	·16	·54	64	·4128	
520	6·86	·14	·57			
[550]	·00	·11	·66	52	·4418	130·8742

SSW. 4. 59°56′N 7°27′W 20.7.50
576 m. 1730-1850

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	12·53	35·19	26·64	141		
10	·36	·25	·73	133	·0137	
20	·06	·26	·79	127	·0267	
30	11·03	·28	27·00	108	·0385	
50	9·83	·28	·21	88	·0581	
75	·51	·28	·27	83	·0795	
100	·33	·28	·30	81	·1000	
150	·18	·28	·33	79	·1400	
200	·13	·28	·33	80	·1798	
[300]	·02	·27	·35	80	·2598	
400	8·93	·26	·35	82	·3408	
[500]	·82	·26	·37	82	·4228	
550	·76	·26	·38	82	·4638	131·8763

S. 4. 59°44′N 7°15′W 20.7.50
980 m. 1500-1555

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	12·96	35·18	26·56	149		
10	·94	·17	·55	150	·0150	
20	·84	·17	·57	148	·0299	
30	13·41	·17	·45	160	·0453	
50	11·40	·28	·93	115	·0728	
75	10·25	·32	27·17	93	·0988	
100	11·14	·28	26·98	111	·1243	
150	9·30	·30	27·32	80	·1721	
200	·13	·28	·33	80	·2121	
[300]	·01	·29	·36	79	·2916	
400	8·96	·29	·37	80	·3711	
[500]	·87	·27	·37	82	·4521	
[550]	·78	·26	·38	82	·4931	146·9153
600	·68	·25	·38			

SW. 2. 59°31′N 7°05′W 20.7.50
980 m. 1140-1330

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	13·14	35·19	26·52	153		
10	·11	·23	·56	149	·0151	
20	11·97	·26	·81	126	·0289	
30	10·73	·28	27·06	102	·0403	
50	11·01	·27	·00	108	·0613	
75	10·94	·27	·01	108	·0883	
100	9·53	·28	·26	85	·1124	
150	·38	·28	·29	83	·1544	
200	·20	·32	·35	78	·1946	
[300]	·03	·31	·37	78	·2726	
400	8·94	·30	·38	79	·3511	
500	·82	·28	·38	81	·4311	
[550]	·75	·28	·40	80	·4713	137·6463
600	·67	·29	·41	80		

SW. 4. 59°17′N 6°53′W 20.7.50
679 m. 0735-0935

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	13·14	35·18	26·52	153		
10	·13	·20	·53	152	·0152	
20	·05	·19	·55	150	·0303	
30	11·76	·20	·81	126	·0441	
50	9·65	·23	27·21	88	·0655	
75	·81	·26	·20	90	·0877	
100	·68	·28	·24	86	·1097	
150	·79	·31	·24	88	·1532	
200	·83	·29	·22	90	·1977	
300	·11	·30	·35	80	·2827	
400	·08	·31	·36	81	·3632	
500	·22	·33	·36	83	·4452	
[550]				84	·4870	141·5390
650	8·94	·28	·36	86		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
WSW. 4.			59°00′N 6°40′W			20.7.50
			153 m.			0420-0545
0	13·65	35·08	26·34	170		
10	·58	·08	·35	169	·0170	
20	11·66	·28	·89	118	·0314	
30	10·90	·30	27·04	104	·0425	
50	·30	·33	·17	92	·0621	
75	9·96	·34	·24	86	·0843	
100	·67	·34	·29	82	·1053	
[135]	·53	·34	·31	81	·1338	10·1267
145	·51	·34	·32	80	·1418	
[200]				90	·1886	
[300]				80	·2736	
[400]				81	·3541	
[500]				83	·4361	
[550]				84	·4779	137·4457
W. 4.			58°50′N 6°26′W			20.7.50
			117 m.			0210-0225
0	13·68	35·07	26·32	172		
10	·68	·05	·31	173	·0172	
20	·45	·08	·38	166	·0342	
30	11·51	·11	·78	129	·0490	
40	10·09	·17	27·09	99	·0604	
50	9·64	·25	·22	87	·0697	
75	·26	·25	·29	81	·0907	
105	·26	·25	·29	82	·1151	
[114]				82	·1234	8·1217
[135]				81	·1405	10·8927
SW. 3.			58°40′N 6°10′W			19/20.7.50
			111 m.			2325-0025
0	13·62	34·72	26·07	195		
10	·25	·73	·15	188	·0192	
20	12·74	·75	·27	177	·0374	
30	·54	·77	·32	172	·0548	
50	·35	·79	·37	168	·0888	
75	11·86	·86	·53	153	·1289	
106	10·55	·97	·85	124	·1718	
[114]				90	·1804	11·0668

VOLUME TRANSPORT

		Km³/hr.
60°54′N 8°16′W.	ΔQ=·1575×165− 13·4029= 12·5846	+0·18
60°45′N 8°08′W.	ΔQ=·1545×165− 13·5318= 11·9607	
”	ΔQ=·4352×550−129·8066=109·5534	+0·58
60°35′N 8°00′W.	ΔQ=·4358×550−132·1780=107·5120	+7·98
60°23½′N 7°49½′W.	ΔQ=·3577×550−117·3628= 79·3722	−9·30
60°12′N 7°40′W.	ΔQ=·4418×550−130·8742=112·1158	−3·16
59°56′N 7°27′W.	ΔQ=·4638×550−131·8763=123·2137	−0·31
59°44′N 7°15′W.	ΔQ=·4931×550−146·9153=124·2897	+0·78
59°31′N 7°05′W.	ΔQ=·4713×550−137·6463=121·5687	−1·36
59°17′N 6°53′W.	ΔQ=·4870×550−141·5390=126·3110	+0·26
59°00′N 6°40′W.	ΔQ=·4779×550−137·4457=125·3993	
”	ΔQ=·1338×135− 10·1267= 7·9363	−0·04
58°50′N 6°26′W.	ΔQ=·1405×135− 10·8927= 8·0748	
”	ΔQ=·1234×114− 8·1217= 5·9459	−1·03*
58°40′N 6°10′W.	ΔQ=·1804×114− 11·0668= 9·4988	
		−5·42
	less	·51
		−4·91

NOLSØ, FAROE—FLUGGA, SHETLAND

F.R.S. *EXPLORER*

2-4 August, 1950

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
NE. 3.			62°00′N 6°12′W			2.8.50
			115 m.			2145-2220
0	10·81	35·12	26·92	115		
10	·65	·12	·95	112	·0114	
20	·14	·13	·05	103	·0222	
30	9·66	·14	·14	94	·0320	
50	·55	·16	·17	92	·0506	
75	·51	·14	·16	93	·0737	
100	·51	·08	·12	98	·0976	
100	·51	·09	·12	98	·1074	
[155]				88	·1492	11·8155
NE. 3.			61°54′N 5°45′W			2/3.8.50
			192 m.			2330-0005
0	11·44	35·08	26·77	129		
10	·42	·09	·79	127	·0128	
20	10·94	·08	·81	126	·0254	
30	·76	·08	·90	117	·0376	
50	9·43	·12	27·16	93	·0586	
75	8·82	·12	·26	84	·0807	
100	·16	·13	·37	74	·1005	
150	·17	·19	·42	70	·1365	
[155]				70	·1400	12·1544
180	·17	·20	·43	70	·1575	
[185]				70	·1610	16·6694
NNE. 4.			61°49′N 5°21′W			3.8.50
			174 m.			0240-0515
0	11·44	35·08	26·77	129		
10	·44	·08	·77	129	·0129	
20	·27	·08	·81	126	·0257	
30	10·30	·10	27·00	108	·0374	
50	9·38	·10	·15	94	·0576	
75	8·54	·14	·32	78	·0791	
100	·18	·17	·40	71	·0977	
150	·03	·19	·44	68	·1325	
170	·01	·19	·44	68	·1461	
[185]				68	·1563	16·2508
[190]				68	·1597	17·0408
NNE. 3.			61°42′N 4°51′W			3.8.50
			203 m.			0720-0740
0	11·63	35·10	26·75	131		
10	·33	·12	·83	123	·0127	
20	·20	·12	·85	122	·0249	
30	10·46	·10	·97	111	·0365	
50	9·56	·16	27·17	92	·0568	
75	8·65	·21	·36	74	·0776	
100	·37	·25	·44	67	·0952	
150	7·97	·25	·49	63	·1277	
[190]				65	·1533	16·5240
195	·94	·22	·48	65	·1565	
[300]				61	·2227	
[350]				56	·2519	49·0715
NE. 1.			61°35′N 4°15′W			3.8.50
			698 m.			1000-1105
0	12·45	35·06	26·57	148		
10	·43	·08	·58	147	·0148	
20	11·72	·10	·74	132	·0288	
30	10·68	·14	·96	112	·0410	
50	9·13	·14	27·22	87	·0609	
75	11·90	·10	26·70	137	·0889	
100	8·36	·12	27·33	78	·1158	
150	7·48	·12	·46	66	·1518	
200	6·66	·10	·56	57	·1826	
300	·88	·10	·53	62	·2421	
[325]				57	·2570	48·6151
[350]				52	·2706	55·2101
400	4·50	34·97	·73	42		
680	0·18	·81	·96	16		

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*Reference to Figure 56 shows that approximately one half of this volume transport was of non-oceanic water; hence the deduction of 0·51 Km³/hr. from the aggregate oceanic volume transport for the section.

Var. 1-2. 61°28′N 3°42′W 3.8.50
1040 m. 1320-1415

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	13·04	35·10	26·48	156		
10	12·80	·10	·53	152	·0154	
20	·09	·10	·67	139	·0300	
30	10·99	·10	·87	120	·0430	
50	·74	·14	·95	113	·0663	
75	8·26	·16	27·38	72	·0894	
100	·57	·14	·32	79	·1083	
150	·81	·14	·28	83	·1488	
200	6·89	·16	·58	55	·1833	
300	3·60	34·94	·80	34	·2278	
[325]				30	·2358	47·2594
[335]				28	·2387	49·6319
400	0·94	·87	·96	17		

Var. 1. 61°21·N 3°10′W 3.8.50
1450 m. 1620-1820

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	13·35	35·17	26·47	157		
10	·02	·12	·50	155	·0156	
20	12·17	·14	·68	138	·0302	
30	11·30	·16	·86	121	·0432	
50	9·13	·14	27·22	87	·0640	
75	8·36	·19	·39	71	·0838	
100	·45	·28	·45	66	·1009	
150	7·82	·21	·49	63	·1331	
200	·42	·18	·52	61	·1641	
300	6·22	·10	·62	53	·2211	
[335]				59	·2407	46·5238
400	7·23	·08	·47	69	·2823	63·5213
600	0·25	34·83	·97	15		

Var. 1. 61°14′N 2°40′W 3.8.50
1050 m. 2035-

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	13·83	35·17	26·37	167		
10	·24	·13	·46	159	·0163	
20	12·84	·16	·57	148	·0317	
30	11·64	·19	·82	125	·0453	
50	10·47	·22	27·06	102	·0680	
75	9·36	·25	·28	82	·0910	
100	10·15	·24	·13	97	·1134	
150	7·91	·22	·48	64	·1536	
200	·23	·19	·56	57	·1838	
400	3·04	34·92	·84	30	·2708	66·9520
[445]				24	·2830	79·4125
600	–0·27	·91	28·07	5		

Var. 1. 61°08′N 2°10′W 3/4.8.50
440 m. 2350-0025

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	13·94	35·28	26·43	161		
10	·42	·26	·53	152	·0156	
20	12·72	·28	·68	138	·0301	
30	·44	·23	·70	136	·0438	
50	10·15	·25	27·14	95	·0669	
75	9·96	·28	·20	90	·0900	
100	·61	·34	·30	81	·1114	
150	·28	·31	·33	79	·1514	
200	·47	·33	·32	81	·1914	
[295]				62	·2593	42·8099
300	·21	·57	·55	61	·2624	
420	8·24	·20	·41	76	·3446	
[445]				67	·3625	89·3729

Var. 2. 61°01′N 1°36′W 4.8.50
146 m. 0245-0300

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	13·74	35·24	26·44	160		
10	·72	·26	·46	159	·0160	
20	·42	·23	·50	155	·0317	
30	12·42	·28	·74	132	·0461	
50	10·55	·33	27·13	96	·0689	
75	·05	·38	·26	84	·0914	
100	9·65	·35	·30	81	·1120	
[130]				75	·1354	10·1148
135	·06	·33	·38	74	·1391	
[200]				78	·1885	
[295]				74	·2607	42·7850

Calm 60°56′N 1°00′W 4.8.50
113 m. 0820-0850

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	13·65	35·25	26·47	157		
10	·56	·24	·48	157	·0157	
20	12·90	·26	·63	143	·0307	
30	11·65	·25	·87	120	·0439	
50	9·69	·24	27·21	88	·0647	
75	·45	·28	·28	82	·0859	
110	8·94	·23	·33	78	·1139	
[130]				76	·1293	9·5805

VOLUME TRANSPORT

		Km³/hr.
62°00′N 6°12′W.	$\Delta Q = \cdot1492 \times 155 - 11\cdot8155 = 11\cdot3105$	+0·49
61°54′N 5°45′W.	$\Delta Q = \cdot1400 \times 155 - 12\cdot1544 = 9\cdot5456$	
”	$\Delta Q = \cdot1610 \times 185 - 16\cdot6694 = 13\cdot1156$	+0·13
61°49′N 5°21′W.	$\Delta Q = \cdot1563 \times 185 - 16\cdot2508 = 12\cdot6647$	
”	$\Delta Q = \cdot1597 \times 190 - 17\cdot0408 = 13\cdot3022$	+0·20
61°42′N 4°51′W.	$\Delta Q = \cdot1533 \times 190 - 16\cdot5240 = 12\cdot6030$	
”	$\Delta Q = \cdot2519 \times 350 - 49\cdot0715 = 39\cdot0935$	−0·11
61°35′N 4°15′W.	$\Delta Q = \cdot2706 \times 350 - 55\cdot2101 = 39\cdot4999$	
”	$\Delta Q = \cdot2570 \times 325 - 48\cdot6151 = 34\cdot9099$	+1·55
61°28′N 3°42′W.	$\Delta Q = \cdot2358 \times 325 - 47\cdot2594 = 29\cdot3756$	
”	$\Delta Q = \cdot2387 \times 335 - 49\cdot6319 = 30\cdot3326$	−1·06
61°21′N 3°10′W.	$\Delta Q = \cdot2407 \times 335 - 46\cdot5238 = 34\cdot1107$	
”	$\Delta Q = \cdot2823 \times 400 - 63\cdot5213 = 49\cdot3987$	+2·26
61°14′N 2°40′W.	$\Delta Q = \cdot2708 \times 400 - 66\cdot9520 = 41\cdot3680$	
”	$\Delta Q = \cdot2830 \times 445 - 79\cdot4125 = 46\cdot5225$	−7·17
61°08′N 2°10′W.	$\Delta Q = \cdot3625 \times 445 - 89\cdot3729 = 71\cdot9396$	
”	$\Delta Q = \cdot2593 \times 295 - 42\cdot8099 = 33\cdot6836$	−0·12
61°01′N 1°36′W.	$\Delta Q = \cdot2607 \times 295 - 42\cdot7850 = 34\cdot1215$	
”	$\Delta Q = \cdot1354 \times 130 - 10\cdot1148 = 7\cdot4872$	+0·07
60°56′N 1°00′W.	$\Delta Q = \cdot1293 \times 130 - 9\cdot5805 = 7\cdot2285$	
		−3·76

NOLSØ, FAROE—FLUGGA, SHETLAND

Danish Research Vessel, *DANA*
17-19 August, 1950

SE. 2. 62°00′N 6°12′W 17.8.50
122 m. 1920-

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·44	35·19	27·04	103		
10	·48	·16	·01	106	·0104	
20	·34	·16	·03	105	·0210	
50	·02	·18	·11	98	·0514	
75	9·85	·20	·15	94	·0754	
115	·69	·21	·19	91	·1124	
[200]				70	·1808	19·0970

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SE. 2-3.			61°54½′N 5°45′W 279 m.			17.8.50 2145-
0	11·52	35·16	26·82	124		
10	·51	·17	·83	123	·0124	
20	·50	·19	·85	122	·0246	
50	9·36	·24	27·27	82	·0552	
75	8·90	·26	·35	75	·0748	
100	·31	·26	·45	66	·0924	
150	7·94	·27	·51	61	·1242	
200	·85	·26	·53	60	·1544	17·5390
[230]				60	·1724	22·4410
268	·72	·26	·55	60		
SE. 2-3.			61°49′N 5°21′W 182 m.			17/18.8.50 2355-0020
0	11·42	35·16	26·84	122		
10	·42	·18	·85	121	·0122	
20	·14	·17	·92	115	·0240	
50	9·40	·25	27·27	82	·0536	
75	8·78	·26	·37	73	·0730	
100	·33	·26	·44	67	·0905	
175	·07	·26	·48	65	·1400	
[200]				60	·1556	
[230]				54	·1727	22·2956
[240]				53	·1782	24·0471
SE. 4.			61°42½′N 4°51′W 300 m.			18.8.50 0245-
0	11·55	35·16	26·81	125		
10	·52	·16	·82	124	·0124	
20	·49	·16	·83	124	·0248	
50	10·02	·23	27·14	95	·0576	
75	8·60	·24	·38	72	·0785	
100	·36	·28	·46	65	·0956	
150	7·82	·26	·53	60	·1268	
200	·32	·26	·60	54	·1553	
[240]				53	·1767	24·6139
290	6·85	·21	·63	52		
[300]				51	·2079	
[350]				46	·2321	47·1519
SE. 4.			61°35′N 4°15′W 1030 m.			18.8.50 0555-0635
0	12·38	35·24	26·72	134		
10	·38	·23	·71	135	·0134	
20	·30	·21	·71	135	·0269	
30	·08	·22	·76	130	·0401	
50	9·93	·26	27·18	91	·0622	
75	8·73	·30	·41	70	·0823	
100	·40	·30	·46	65	·0992	
150	7·72	·30	·58	55	·1292	
200	·24	·26	·61	53	·1562	
300	5·80	·16	·73	42	·2037	
[350]				35	·2229	47·2065
400	3·07	34·98	·88	27	·2382	
[435]				22	·2468	67·1240
500	1·55	·96	28·00	14		
ESE. 4.			61°28′N 3°42′W 1300 m.			18.8.50 1005-1040
0	12·42	35·24	26·71	135		
10	·38	·24	·72	134	·0134	
20	·08	·24	·78	128	·0265	
30	10·50	·26	27·08	100	·0379	
50	9·60	·35	·31	79	·0558	
75	·12	·41	·44	67	·0740	
100	8·95	·37	·43	68	·0909	
150	·63	·33	·45	67	·1247	
200	·23	·26	·46	67	·1682	
300	7·14	·24	·61	54	·2287	
400	5·56	·14	·74	42	·2767	
[435]				35	·2902	72·9575
[440]				34	·2919	74·4087
500	2·37	34·97	·94	21		
ESE. 4.			61°21′N 3°10′W 1310 m.			18.8.50 1325-1355
0	12·72	35·29	26·69	136		
10	·70	·17	·60	145	·0140	
20	·60	·17	·62	144	·0284	
50	11·01	·29	27·02	106	·0659	
75	9·55	·37	·33	77	·0888	
100	8·82	·33	·42	69	·1070	
150	·12	·26	·47	65	·1405	
200	7·23	·25	·61	53	·1700	
300	4·81	·12	·82	33	·2130	
[380]				19	·2338	57·0498
400	1·92	34·98	·98	16	·2375	
[440]				13	·2433	71·3188
500	0·47	·93	28·04	9		
E. 3-4.			61°14′N 2°40′W 1080 m.			18.8.50 1655-1725
0	12·67	35·24	26·66	139		
10	·67	·26	·68	138	·0138	
20	·32	·26	·74	132	·0273	
50	9·17	·33	27·37	73	·0581	
75	8·80	·34	·43	68	·0757	
100	·39	·34	·50	62	·0919	
150	7·87	·30	·56	57	·1217	
200	·56	·27	·58	56	·1499	
300	6·20	·17	·68	47	·2014	
[380]				27	·2310	52·3145
400	2·73	·00	·93	22	·2359	
[495]				10	·2511	80·0160
500	0·73	34·96	28·05	9		
ENE. 1.			61°08′N 2°10′W 625 m.			18.8.50 2030-2115
0	12·40	35·21	26·69	136		
10	·40	·21	·69	137	·0136	
20	·06	·20	·75	131	·0270	
50	10·20	·25	27·13	96	·0610	
75	8·72	·30	·41	70	·0818	
100	·51	·29	·44	67	·0989	
150	·02	·26	·49	63	·1314	
200	7·72	·26	·55	58	·1616	
250	·52	·25	·57	57	·1904	
300	·22	·24	·60	55	·2184	
[360]				50	·2499	51·7863
400	5·88	·14	·70	46	·2689	
[495]				32	·3059	89·4053
500	4·20	·09	·86	31		
ENE. 1.			61°01′N 1°36′W 156 m.			19.8.50 0030-0045
0	13·20	35·28	26·58	147		
10	·19	·34	·63	142	·0144	
20	·09	·30	·62	144	·0287	
50	11·90	·37	·91	117	·0679	
75	10·40	·38	27·20	90	·0938	
100	9·79	·43	·34	77	·1147	
[130]				75	·1375	10·1469
140	·42	·41	·38	74		
[200]				67	·1872	
[300]				58	·2497	
[360]				55	·2836	59·3554
SSE. 2.			60°53′N 1°06′W 108 m.			19.8.50 0235-0255
0	13·50	35·28	26·53	152		
10	·50	·24	·49	156	·0154	
20	·43	·26	·52	153	·0308	
30	·35	·26	·54	151	·0460	
50	9·90	·25	27·18	91	·0702	
75	·48	·26	·26	84	·0921	
100	·44	·26	·27	84	·1131	
[130]				78	·1374	10·2053

Volume Transport

		Km³/hr.
62°00′N 6°12′W.	$\Delta Q=\cdot1808\times200-19{\cdot}0970=17{\cdot}0630$	+1·04
61°54½′N 5°45′W.	$\Delta Q=\cdot1544\times200-17{\cdot}5390=13{\cdot}3410$	
”	$\Delta Q=\cdot1724\times230-22{\cdot}4410=17{\cdot}2110$	−0·06
61°49′N 5°21′W.	$\Delta Q=\cdot1727\times230-22{\cdot}2956=17{\cdot}4254$	
”	$\Delta Q=\cdot1782\times240-24{\cdot}0471=18{\cdot}7209$	+0·26
61°42½′N 4°51′W.	$\Delta Q=\cdot1767\times240-24{\cdot}6139=17{\cdot}7941$	
”	$\Delta Q=\cdot2321\times350-47{\cdot}1519=34{\cdot}0831$	+0·92
61°35′N 4°15′W.	$\Delta Q=\cdot2229\times350-47{\cdot}2065=30{\cdot}8085$	
”	$\Delta Q=\cdot2468\times435-67{\cdot}1240=40{\cdot}2340$	−3·66
61°28′N 3°42′W.	$\Delta Q=\cdot2902\times435-72{\cdot}9575=53{\cdot}2795$	
”	$\Delta Q=\cdot2919\times440-74{\cdot}4087=54{\cdot}0273$	+5·15
61°21′N 3°10′W.	$\Delta Q=\cdot2433\times440-71{\cdot}3188=35{\cdot}7332$	
”	$\Delta Q=\cdot2338\times380-57{\cdot}0498=31{\cdot}7942$	−1·03
61°14′N 2°40′W.	$\Delta Q=\cdot2310\times380-52{\cdot}3145=35{\cdot}4655$	
”	$\Delta Q=\cdot2511\times495-80{\cdot}0160=44{\cdot}2785$	−5·00
61°08′N 2°10′W.	$\Delta Q=\cdot3059\times495-89{\cdot}4053=62{\cdot}0152$	
”	$\Delta Q=\cdot2499\times360-51{\cdot}7863=38{\cdot}1777$	−1·29
61°01′N 1°36′W.	$\Delta Q=\cdot2836\times360-59{\cdot}3554=42{\cdot}7406$	
”	$\Delta Q=\cdot1375\times130-10{\cdot}1469=7{\cdot}7281$	+0·02
60°53′N 1°06′W.	$\Delta Q=\cdot1374\times130-10{\cdot}2053=7{\cdot}6567$	
		−3·65

FAROE BANK—BUTT OF LEWIS
F.R.S. *SCOTIA*
3-5 November, 1950

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
SE. 2-3.		60°54′N 8°16′W				4/5.11.50
		178 m.				2350-0033
0	9·44	35·18	27·20	88		
10	·45	·20	·22	86	·0087	
20	·45	·20	·22	87	·0173	
30	·45	·19	·21	88	·0261	
50	·44	·18	·20	89	·0438	
75	·43	·15	·18	92	·0664	
100	·43	·17	·20	90	·0894	
150	·36	·17	·21	90	·1342	
175	·44	·18	·20	92		
[200]				90	·1792	
[300]				87	·2677	
[400]				87	·3547	
[500]				38	·4172	
[550]				25	·4330	131·1470
SE. 3.		60°45′N 8°08′W				4.11.50
		802 m.				2225-
0	9·73	35·27	27·22	86		
10	·74	·24	·20	88	·0087	
20	·75	·26	·21	88	·0175	
30	·75	·23	·19	90	·0264	
50	·74	·24	·20	89	·0443	
75	·74	·26	·22	88	·0664	
100	·75	·28	·23	88	·0884	
150	·71	·27	·23	89	·1326	
200	·55	·36	·32	81	·1751	
300	·38	·27	·28	87	·2591	
400	·02	·21	·30	87	·3461	
[500]	3·63	34·90	·78	38	·4086	
[550]				25	·4244	128·1673
600	0·29	·85	28·00	13		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
ESE. 1-2.		60°35′N 8°00′W				4.11.50
		932 m.				2040-2120
0	9·81	35·28	27·22	86		
10	·83	·29	·22	86	·0086	
20	·83	·28	·21	88	·0173	
30	·83	·27	·21	88	·0261	
50	·83	·26	·20	89	·0438	
75	·82	·24	·19	91	·0663	
100	·81	·26	·20	90	·0889	
150	·79	·27	·21	90	·1339	
200	·60	·28	·26	87	·1781	
300	·00	·27	·35	80	·2616	
400	8·68	·25	·38	79	·3411	
[500]	6·32	·07	·59	59	·4101	
[550]				45	·4361	128·6097
600	3·47	34·97	·85	32		
E. 2.		60°23½′N 7°49½′W				4.11.50
		905 m.				1810-
0	9·84	35·26	27·20	88		
10	·87	·21	·15	93	·0090	
20	·87	·24	·18	90	·0182	
30	·87	·24	·18	91	·0272	
50	·87	·25	·18	91	·0454	
75	·89	·25	·18	92	·0683	
100	·89	·25	·18	92	·0913	
150	·88	·26	·19	92	·1373	
200	·69	·23	·20	92	·1833	
300	8·40	·26	·43	72	·2653	
400	6·35	·19	·68	49	·3258	
[500]	4·30	·02	·79	37	·3688	
[550]				29	·3853	123·8477
600	2·27	34·97	·95	21		
E. 2.		60°12′N 7°40′W				4.11.50
		622 m.				1550-
0	9·81	35·28	27·22	86		
10	·81	·28	·22	86	·0086	
20	·81	·26	·20	88	·0173	
30	·82	·26	·19	90	·0262	
50	·83	·25	·19	90	·0442	
75	·84	·26	·20	90	·0667	
100	·84	·28	·22	88	·0889	
150	·84	·24	·18	93	·1341	
200	·87	·25	·19	93	·1806	
300	·13	·28	·33	82	·2681	
400	·05	·21	·29	88	·3531	
[500]	8·03	·23	·46	73	·4336	
[550]				53	·4651	133·1652
600	5·24	·25	·86	33		
NE. 3.		59°56′N 7°27′W				4.11.50
		787 m.				1210-1320
0	9·93	35·25	27·18	90		
10	·94	·26	·18	90	·0090	
20	·94	·26	·18	90	·0180	
30	·94	·25	·17	92	·0271	
50	·94	·26	·18	91	·0454	
75	·95	·26	·18	92	·0683	
100	·95	·26	·18	92	·0913	
150	·95	·26	·18	93	·1375	
200	·59	·28	·26	87	·1825	
300	·40	·28	·29	86	·2690	
400	·25	·26	·30	87	·3555	
[500]	8·95	·26	·35	84	·4410	
[550]				85	·4832	134·9967
600	·95	·26	·35	86		

NE. 3. 59°44′N 7°15′W 4.11.50
914 m. 0900-1020

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	9·93	35·26	27·18	90		
10	·93	·26	·18	90	·0090	
20	·93	·30	·22	87	·0178	
30	·93	·25	·18	91	·0267	
50	·93	·27	·19	90	·0448	
75	·94	·26	·18	92	·0676	
100	·94	·25	·17	93	·0907	
150	·94	·25	·17	94	·1375	
200	·50	·26	·25	88	·1830	
300	·19	·29	·33	82	·2680	
400	·03	·30	·37	80	·3490	
[500]	8·85	·27	·37	82	·4300	
[550]				83	·4712	133·0978
600	·66	·23	·37	84		

ENE. 4-5. 59°31′N 7°05′W 4.11.50
1051 m. 0600-0730

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·03	35·29	27·19	89		
10	·04	·26	·17	91	·0090	
20	·03	·26	·17	91	·0181	
30	·03	·27	·17	92	·0273	
50	·03	·25	·16	93	·0458	
75	·03	·26	·17	93	·0690	
100	·04	·25	·16	94	·0924	
150	·04	·26	·17	94	·1394	
200	9·78	·29	·23	90	·1854	
300	·19	·27	·32	83	·2719	
400	·01	·25	·33	84	·3554	
[500]	8·95	·25	·34	85	·4399	
[550]				84	·4821	135·5510
600	·78	·25	·37	83		

NE. 3. 59°17′N 6°53′W 4.11.50
604 m. 0215-

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·74	35·26	27·04	103		
10	·74	·24	·03	104	·0104	
20	·74	·24	·03	105	·0208	
30	·74	·23	·02	106	·0314	
50	·74	·22	·04	104	·0524	
75	·75	·26	·01	108	·0789	
[100]	·75	·26	·04	106	·1057	
125	·75	·26	·04	106	·1322	
150	·72	·24	·03	108	·1590	
200	·32	·27	·13	99	·2108	
300	9·80	·27	·22	93	·3068	
[380]				94	·3816	74·3342
400	·74	·27	·23	94	·4003	
[500]	·70	·26	·23	97	·4958	
[550]				97	·5443	152·9857
600	·65	·26	·23	97		

NE. 5-6. 59°00′N 6°40′W 3.11.50
156 m. 2245-2325

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·81	35·17	26·96	111		
10	·79	·17	·96	111	·0111	
20	·78	·24	27·02	106	·0219	
30	·79	·23	·01	107	·0325	
50	·79	·24	·02	106	·0538	
75	·80	·20	26·98	111	·0809	
100	·80	·21	·99	110	·1085	
125	·80	·21	·99	111	·1361	
[135]				111	·1472	9·8816
150	·76	·22	27·01	110	·1637	
[200]				108	·2182	
[300]				96	·3202	
[380]				96	·3970	77·3673

NE. 5-6. 58°50′N 6°26′W 3.11.50
113 m. 2030-

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	11·01	35·05	26·83	123		
10	·00	·05	·83	123	·0123	
20	·04	·03	·82	125	·0247	
30	·04	·05	·83	124	·0371	
50	·04	·05	·83	124	·0619	
75	·15	·08	·83	125	·0930	
[100]				125	·1242	
110	·09	·06	·83	126		
[116]				126	·1443	8·3447
[135]				124	·1678	11·3067

NE. 4. 58°40′N 6°10′W 3.11.50
119 m. 1800-1848

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	11·14	35·11	26·85	121		
10	·14	·08	·83	123	·0122	
20	·14	·10	·85	122	·0244	
30	·14	·09	·84	123	·0366	
50	·14	·10	·85	122	·0611	
75	·14	·18	·91	117	·0910	
100	·09	·17	·91	118	·1204	
116	·01	·18	·93	116	·1391	8·1457

Volume Transport

			Km³/hr
60°54′N	8°16′W.	ΔQ=·4330×550−131·1470=107·0030	
60°45′N	8°08′W.	ΔQ=·4244×550−128·1673=105·2527	+0·50
60°35′N	8°00′W.	ΔQ=·4361×550−128·6097=111·2453	−1·70
60°23½′N	7°49½′W.	ΔQ=·3853×550−123·8477= 88·0673	+6·58
60°12′N	7°40′W.	ΔQ=·4651×550−133·1652=122·6398	−9·82
59°56′N	7°27′W.	ΔQ=·4832×550−134·9967=130·7633	−2·31
59°44′N	7°15′W.	ΔQ=·4712×550−133·0978=126·0622	+1·34
59°31′N	7°05′W.	ΔQ=·4821×550−135·5510=129·6040	−1·01
59°17′N	6°53′W.	ΔQ=·5443×550−152·9857=146·3793	−4·81
”		ΔQ=·3816×380− 74·3342= 70·6738	
59°00′N	6°40′W.	ΔQ=·3970×380− 77·3673= 73·4927	−0·81
”		ΔQ=·1472×135− 9·8816= 9·9904	
58°50′N	6°26′W.	ΔQ=·1678×135− 11·3067= 11·3463	−0·39
”		ΔQ=·1443×116− 8·3447= 8·3941	
58°40′N	6°10′W.	ΔQ=·1391×116− 8·1457= 7·9899	+0·12
			−12·31

1951

LATITUDE 62°02′N, LONGITUDE 9°18′W
—FAROE BANK—BUTT OF LEWIS—
F.R.S. *SCOTIA*
18-20 May, 1951

SE. 6. 62°02′N 9°18′W 20.5.51
503 m. 1415-1500

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	8·49	35·32	27·47	62		
10	·49	·32	·47	63	·0062	
20	·44	·30	·46	64	·0126	
30	·40	·28	·45	65	·0190	
50	·45	·30	·46	64	·0319	
75	7·94	·30	·54	57	·0470	
100	·93	·30	·54	58	·0614	
150	·94	·30	·54	59	·0906	
200	·78	·30	·56	57	·1196	
300	·71	·29	·56	59	·1776	
400	·35	·27	·60	57	·2356	
450	6·30	·24	·72	46	·2614	
[495]				32	·2790	72·2922

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
E.6.			61°48′N 9°06′W			20.5.51
			620 m.			1156-1230
0	8·42	35·26	27·43	66		
10	·42	·27	·44	66	·0066	
20	·36	·26	·44	66	·0132	
30	·23	·34	·52	58	·0194	
50	·42	·35	·50	61	·0313	
75	·11	·34	·54	57	·0461	
100	7·95	·34	·58	54	·0600	
150	·64	·34	·62	51	·0862	
200	·41	·37	·68	46	·1104	
300	·05	·42	·77	39	·1529	
400	6·20	·25	·75	42	·1934	
[495]				12	·2190	61·7347
500	0·75	34·95	28·04	10	·2245	
[565]				?5	·2294	77·5953
SE. 6.			61°35′N 8°53′W			20.5.51
			630 m.			0935-1025
0	9·36	35·28	27·30	79		
10	·36	·28	·30	79	·0079	
20	8·72	·26	·38	71	·0154	
30	·72	·28	·40	70	·0224	
50	·72	·28	·40	70	·0364	
75	·37	·28	·41	70	·0539	
100	·35	·28	·41	70	·0714	
150	·73	·28	·40	72	·1069	
200	·15	·28	·49	64	·1409	
300	·02	·28	·50	65	·2054	
400	7·95	·28	·52	65	·2704	
[455]				64	·3059	71·2337
500	·80	·28	·55	64	·3347	
[550]	·52	·28	·59	61	·3659	
[565]				60	·3750	108·7190
SE. 5-6.			61°21½′N 8°41′W			20.5.51
			285 m.			0745-0805
0	8·80	35·26	27·37	72		
10	·80	·26	·37	72	·0072	
20	·52	·26	·41	69	·0142	
30	·42	·26	·43	67	·0210	
50	·32	·26	·45	65	·0342	
75	·58	·26	·41	70	·0511	
100	·30	·26	·45	66	·0681	
150	·02	·26	·49	63	·1003	
[195]				61	·1282	12·7784
200	7·90	·26	·52	61	·1312	
250	·77	·26	·54	60	·1614	
[300]				63	·1922	
[455]				64	·2906	66·3589
SE. 5.			61°08′N 8°29′W			20.5.51
			106 m.			0535-0600
0	8·71	35·17	27·32	77		
10	·71	·34	·45	65	·0071	
20	·71	·26	·38	71	·0139	
30	·20	·26	·46	64	·0207	
50	·03	·25	·48	62	·0333	
75	·24	·26	·46	65	·0492	
100	·01	·26	·49	62	·0651	
[120]				65	·0778	4·7425
[195]				61	·1250	12·3475

VOLUME TRANSPORT

			Km³/hr.
62°02′N	9°18′W	ΔQ = ·2790 × 495 − 72·2922 = 65·8128	+ 5·36
61°48′N	9°06′W	ΔQ = ·2190 × 495 − 61·7347 = 46·6703	
„		ΔQ = ·2294 × 565 − 77·5953 = 52·0157	−14·34
61°35′N	8°53′W	ΔQ = ·3750 × 565 − 108·7190 = 103·1560	
„		ΔQ = ·3059 × 455 − 71·2337 = 67·9508	+ 0·59
61°21½′N	8°41′W	ΔQ = ·2906 × 455 − 66·3589 = 65·8641	
„		ΔQ = ·1282 × 195 − 12·7784 = 12·2206	+ 0·05
61°08′N	8°29′W	ΔQ = ·1250 × 195 − 12·3475 = 12·0275	
„		ΔQ = ·0778 × 120 − 4·7425 = 4·5935	+ 0·00
61°54′N	8°16′W	ΔQ = ·0792 × 120 − 4·9157 = 4·5883	
			− 8·34

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
SSE. 4-5.			60°54′N 8°16′W			20.5.51
			137 m.			0000-0030
0	8·98	35·25	27·34	75		
10	9·01	·25	·33	76	·0076	
20	8·84	·25	·36	73	·0150	
30	·51	·26	·42	68	·0220	
50	·12	·26	·48	63	·0351	
75	·10	·25	·47	64	·0510	
100	7·98	·26	·50	62	·0668	
120	·98	·26	·50	62	·0792	4·9157
[150]				63	·0980	
[200]				66	·1302	
[300]				67	·1967	
[400]				64	·2622	
[500]				61	·3247	
[550]				55	·3537	98·8737
SSE. 3-4.			60°45′N 8°08′W			19.5.51
			825 m.			2200-2310
0	9·23	35·35	27·37	72		
10	·21	·35	·38	71	·0072	
20	8·80	·35	·44	66	·0140	
30	·72	·35	·46	64	·0205	
50	·66	·34	·46	64	·0333	
75	·62	·34	·47	64	·0493	
100	·55	·33	·47	64	·0653	
150	·54	·32	·46	66	·0978	
200	·44	·29	·45	68	·1313	
300	·24	·30	·49	66	·1983	
400	7·94	·30	·54	63	·2628	
500	·45	·27	·59	60	·3243	
[550]	6·93	·25	·66	54	·3528	98·9450
600	·28	·25	·75	45		
SE. 3.			60°35′N 8°00′W			19.5.51
			888 m.			1930-2000
0	9·52	35·34	27·32	77		
10	·11	·35	·39	70	·0074	
20	8·77	·37	·47	63	·0140	
30	·72	·35	·46	64	·0204	
50	·73	·35	·46	64	·0332	
75	·73	·35	·46	65	·0493	
100	·75	·34	·44	67	·0658	
150	·75	·37	·47	65	·0988	
200	·86	·37	·45	68	·1320	
300	·12	·32	·52	63	·1975	
400	7·57	·26	·57	60	·2590	
500	4·95	·15	·83	34	·3060	
[550]	3·24	·04	28·00	17	·3188	96·3770
600	1·98	34·98	·06	10		
Var. 1.			60°23½′N 7°49½′W			19.5.51
			914 m.			1700-1840
0	9·28	35·35	27·37	72		
10	·06	·35	·40	69	·0070	
20	8·92	·36	·43	67	·0138	
30	·73	·35	·46	64	·0204	
50	·58	·35	·48	63	·0331	
75	·65	·34	·46	65	·0491	
100	·33	·34	·51	61	·0649	
150	·33	·33	·50	63	·0959	
200	·00	·35	·57	57	·1259	
300	7·91	·33	·57	59	·1839	
400	·69	·32	·59	58	·2424	
500	5·51	·19	·78	40	·2914	
[550]				27	·3082	91·3575
600	1·12	34·94	28·01	13		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
Var. 1-2.			60°12′N 7°40′W			19.5.51
			660 m.			1425-1535
0	9·55	35·34	27·31	78		
10	·17	·33	·37	72	·0075	
20	8·92	·32	·40	70	·0146	
30	·82	·31	·41	69	·0216	
50	·72	·32	·43	67	·0352	
75	·80	·31	·41	70	·0523	
100	·73	·32	·43	68	·0695	
150	·90	·30	·39	73	·1047	
200	·61	·30	·43	70	·1405	
300	·52	·32	·46	69	·2100	
400	·38	·34	·50	67	·2780	
500	·27	·35	·53	66	·3445	
[550]				45	·3723	104·9683
650	–0·30	34·94	28·09	3		
Calm			59°56′N 7°27′W			19.5.51
			585 m.			1145-1240
0	9·61	35·34	27·30	79		
10	·32	·35	·36	73	·0076	
20	·01	·34	·40	70	·0148	
30	8·92	·34	·42	68	·0217	
50	·94	·34	·41	69	·0354	
75	·89	·34	·42	69	·0526	
100	·93	·34	·41	70	·0700	
150	9·04	·34	·40	72	·1055	
200	8·68	·33	·45	68	·1405	
300	·57	·32	·46	69	·2090	
400	·51	·34	·48	69	·2780	
[500]				71	·3480	
[550]				72	·3838	105·4935
575	·39	·32	·48	73		
Calm			59°44′N 7°15′W			19.5.51
			998 m.			0900-1030
0	9·36	35·35	27·35	74		
10	·23	·35	·37	72	·0073	
20	·08	·37	·41	69	·0140	
30	·02	·37	·42	68	·0208	
50	8·94	·39	·45	65	·0341	
75	9·00	·37	·43	68	·0507	
100	8·99	·37	·43	68	·0677	
150	·77	·35	·45	67	·1015	
200	·73	·35	·45	68	·1353	
300	·69	·37	·48	68	·2033	
400	·67	·35	·47	70	·2723	
500	·62	·37	·49	70	·3423	
[550]				72	·3778	102·9985
600	·57	·35	·48	73		
E. 1.			59°31′N 7°05′W			19.5.51
			1024 m.			0620-0720
0	9·46	35·37	27·35	74		
10	·46	·35	·34	75	·0074	
20	·32	·35	·36	73	·0148	
30	·02	·35	·41	69	·0219	
50	8·92	·35	·42	68	·0356	
75	·89	·37	·45	66	·0524	
100	·84	·37	·45	66	·0689	
150	·93	·37	·44	67	·1021	
200	·77	·36	·46	67	·1356	
300	·68	·35	·47	68	·2031	
400	·66	·37	·48	69	·2716	
500	·63	·35	·47	72	·3421	
[550]				73	·3783	103·1052
600	·62	·35	·47	74		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
Var. 1-2.			59°17′N 6°53′W			19.5.51
			585 m.			0300-0340
0	9·50	35·35	27·33	76		
10	·42	·35	·34	75	·0076	
20	·31	·35	·36	73	·0150	
30	·23	·39	·40	70	·0222	
50	·21	·41	·42	68	·0360	
75	·16	·37	·40	71	·0534	
100	·13	·37	·41	70	·0710	
150	·04	·37	·42	70	·1060	
200	·05	·37	·42	71	·1412	
300	·01	·37	·42	73	·2132	
[370]				74	·2464	48·6395
400	8·93	·35	·42	75	·2872	
550	·55	·35	·48	72	·3974	108·2815
Var. 1-2.			59°00′N 6°40′W.			18/19.5.51
			154 m.			2355-0100
0	9·56	35·32	27·30	79		
10	·22	·30	·34	75	·0077	
20	8·88	·32	·41	69	·0149	
30	·88	·32	·41	69	·0218	
50	·85	·37	·45	65	·0352	
75	·78	·37	·46	65	·0514	
100	·64	·35	·47	64	·0675	
[135]				62	·0895	6·2212
150	·14	·30	·51	61	·0987	
[200]				63	·1297	
[300]				73	·1977	
[370]				74	·2491	45·3467
NE. 1-2.			58°50′N 6°26′W			18.5.51
			118 m.			2135-2230
0	9·26	34·96	27·07	100		
10	8·76	35·10	·25	84	·0092	
20	·48	·19	·37	72	·0170	
30	·67	·35	·47	63	·0238	
50	·55	·35	·48	63	·0364	
75	·50	·34	·48	63	·0522	
110	·65	·33	·45	66	·0748	
[120]				66	·0814	5·0940
[135]				63	·0911	6·3878
NE. 1.			58°40′N 6°10′W			18.5.51
			120 m.			1915-2000
0	8·97	35·03	27·16	92		
10	·53	·10	·29	80	·0086	
20	·36	·10	·32	77	·0164	
30	·44	·23	·41	69	·0237	
50	·45	·32	·47	63	·0369	
75	·41	·23	·41	70	·0535	
115	·14	·28	·49	63	·0801	
[120]				63	·0833	5·1850

Volume Transport

		Km³/hr.
60°54′N 8°16′W.	ΔQ=·3537×550— 98·8737= 95·6613	+0·16
60°45′N 8°08′W.	ΔQ=·3528×550— 98·9450= 95·0950	+4·57
60°35′N 8°00′W.	ΔQ=·3188×550— 96·3770= 78·9630	+0·26
60°23½′N 7°49½′W.	ΔQ=·3080×550— 91·3575= 78·0425	−6·18
61°12′N 7°40′W.	ΔQ=·3723×550—104·9683= 99·7967	−1·65
59°56′N 7°27′W.	ΔQ=·3838×550—105·4935=105·5965	+0·23
59°44′N 7°15′W.	ΔQ=·3778×550—102·9985=104·7915	−0·05
59°31′N 7°05′W.	ΔQ=·3783×550—103·1052=104·9598	−1·53
59°17′N 6°53′W.	ΔQ=·3974×550—108·2815=110·2885	
„	ΔQ=·2646×370— 48·6395= 49·2625	+0·70
59°00′N 6°40′W.	ΔQ=·2491×370— 45·3467= 46·8203	
„	ΔQ=·0895×135— 6·2212= 5·8613	−0·01
58°50′N 6°26′W.	ΔQ=·0911×135— 6·3878= 5·9107	
„	ΔQ=·0814×120— 5·0940= 4·6740	−0·04
58°40′N 6°10′W.	ΔQ=·0833×120— 5.1850= 4·8110	
		−3·54

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m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
WSW. 4.			62°00′N 6°12′W 123 m.			1.6.51 0235-0340
0	7·23	35·19	27·56	54		
10	·22	·20	·57	53	·0054	
20	·19	·20	·57	53	·0107	
30	·16	·19	·57	54	·0161	
50	·12	·19	·57	54	·0269	
75	·07	·20	·59	52	·0401	
100	6·93	·20	·61	51	·0530	
120	·83	·20	·62	50	·0631	
[150]				47	·0777	
[210]				30	·1008	11·3008
W. 2.			61°54′N 5°45′W 300 m.			1.6.51 0455-0545
0	7·67	35·23	27·52	58		
10	·65	·25	·54	56	·0057	
20	·56	·25	·55	55	·0113	
30	·54	·24	·55	55	·0168	
50	·12	·21	·59	52	·0275	
75	6·91	·23	·63	49	·0401	
100	·64	·23	·67	45	·0519	
150	·92	·25	·65	48	·0751	
200	5·32	·23	·84	30	·0946	
[210]				30	·0976	11·0705
[235]				28	·1048	13·5990
300	4·63	·21	·90	25		
W. 1-2.			61°49′N 5°21′W 170 m.			1.6.51 0650-0715
0	7·81	35·22	27·49	61		
10	·80	·24	·51	59	·0060	
20	·73	·25	·53	57	·0118	
30	·58	·26	·56	54	·0174	
50	·37	·26	·59	52	·0280	
75	·27	·23	·58	53	·0411	
100	6·77	·25	·67	45	·0533	
165	·69	·25	·68	45	·0825	
[205]				30	·0975	10·7763
[235]				28	·1062	13·8318
W. 1-2.			61°42′N 4°51′W 240 m.			1.6.51 0850-0950
0	8·01	35·37	27·58	52		
10	7·98	·30	·53	57	·0054	
20	·94	·30	·54	56	·0110	
30	·92	·26	·51	59	·0168	
50	·80	·26	·53	58	·0285	
75	·45	·26	·58	53	·0424	
100	·32	·35	·67	45	·0546	
150	6·91	·36	·73	40	·0758	
200	·92	·30	·68	46	·0973	
[205]				46	·0996	10·8594
235	5·75	·13	·71	43	·1129	
[300]				35	·1383	22·2297
E/N. 1.			61°35′N 4°15′W 823 m.			1.6.51 1130-1200
0	8·77	35·31	27·42	67		
10	·62	·28	·42	67	·0067	
20	·60	·28	·42	68	·0135	
30	·49	·28	·44	66	·0202	
50	7·53	·26	·57	54	·0322	
75	·07	·20	·59	52	·0454	
100	6·88	·19	·60	52	·0584	
150	·56	·20	·66	47	·0832	
200	5·84	·08	·65	48	·1070	
300	3·33	·00	·87	27	·1445	23·9645
[360]				19	·1583	33·0485
400	0·71	34·88	·99	14		
NE. 2.			61°28′N 3°42′W 1225 m.			1.6.51 1420-1540
0	8·88	35·35	27·43	66		
10	·78	·35	·45	65	·0066	
20	·77	·35	·45	65	·0131	
30	·76	·30	·41	69	·0198	
50	·52	·25	·41	69	·0336	
75	·11	·26	·48	63	·0501	
100	·53	·26	·41	70	·0667	
150	7·41	·21	·54	58	·0987	
200	·26	·21	·57	56	·1272	
300	6·13	·19	·70	45	·1777	
[360]				38	·2026	39·7727
400	4·13	·04	·82	33	·2168	
[410]				32	·2200	50·3447
500	1·06	34·87	·95	18		
W. 1-2.			61°21′N 3°10′W 1371 m.			1.6.51 1725-2005
0	9·12	35·41	27·44	65		
10	8·88	·37	·45	65	·0065	
20	·82	·32	·42	68	·0131	
30	·74	·32	·43	67	·0199	
50	·52	·28	·43	67	·0333	
75	·43	·30	·46	65	·0498	
100	7·60	·30	·59	53	·0646	
150	·16	·25	·61	52	·0908	
200	6·78	·29	·70	44	·1148	
300	5·87	·19	·74	41	·1573	
400	3·04	34·99	·89	26	·1908	
[410]				25	·1934	45·2523
[490]				17	·2102	61·3963
600	0·21	·94	28·06	7		
NE. 2.			61°14′N 2°40′W 1188 m.			1.6.51 2115-2200
0	9·23	35·39	27·40	69		
10	·12	·37	·41	68	·0068	
20	·05	·39	·43	67	·0136	
30	8·98	·34	·41	69	·0204	
50	·93	·39	·46	64	·0337	
75	·86	·39	·47	64	·0497	
100	·70	·39	·49	63	·0656	
150	·53	·39	·52	61	·0966	
200	·44	·39	·53	61	·1271	
300	7·94	·30	·54	61	·1881	
400	·00	·30	·67	50	·2436	
[490]				33	·2810	73·9302
[500]				31	·2842	
[580]				16	·3030	100·2442
600	0·72	34·92	28·02	12		
ESE. 1-2.			61°08′N 2°10′W 550 m.			2.6.51 0005-0055
0	9·18	35·35	27·38	71		
10	·17	·35	·38	71	·0071	
20	·12	·30	·35	74	·0143	
30	·12	·35	·39	71	·0215	
50	8·99	·27	·35	75	·0361	
75	·85	·35	·44	67	·0539	
100	·71	·35	·46	65	·0704	
150	·56	·35	·48	64	·1026	
200	·57	·30	·44	69	·1358	
300	·25	·35	·53	63	·2018	
[355]				64	·2367	42·8001
400	7·85	·26	·52	65	·2657	
500	·12	·26	·64	55	·3257	
[580]				41	·3641	111·2661

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
ESE. 2.			61°01′N 1°36′W			2.6.51
			157 m.			0305-0327
0	8·79	35·26	27·38	71		
10	·72	·25	·38	71	·0071	
20	·53	·26	·42	68	·0141	
30	·52	·26	·42	68	·0209	
50	·33	·26	·45	65	·0342	
75	·32	·26	·45	66	·0506	
100	7·95	·26	·51	61	·0665	
[130]				60	·0847	5·6593
155	7·44	·21	·54	59	·0996	
[200]				60	·1264	
[300]				63	·1879	
[355]				64	·2228	40·0573
NE. 2.			60°56′N 1°00′W			2.6.51
			106 m.			0520-0600
0	8·64	35·35	27·47	62		
10	·62	·32	·45	65	·0064	
20	·34	·28	·46	64	·0128	
30	7·68	·25	·54	56	·0188	
50	·12	·21	·59	52	·0296	
75	·13	·26	·62	49	·0422	
100	·08	·25	·62	50	·0546	
[130]				54	·0702	4·7495

VOLUME TRANSPORT

		Km³/hr
62°00′N 6°12′W.	ΔQ=·1008×210− 11·3008= 9·8672	+0·12
61°54′N 5°45′W.	ΔQ=·0976×210− 11·0705= 9·4255	
”	ΔQ=·1048×235− 13·5990=11·0290	−0·03
61°49′N 5°21′W.	ΔQ=·1062×235− 13·8318=11·1252	
”	ΔQ=·0975×205− 10·7763= 9·2112	−0·10
61°42′N 4°51′W.	ΔQ=·0996×205− 10·8594= 9·5586	
”	ΔQ=·1383×300− 22·2297=19·2603	−0·04
61°35′N 4°15′W.	ΔQ=·1445×300− 23·9645=19·3855	
”	ΔQ=·1583×360− 33·0485=23·9395	−2·59
61°28′N 3°42′W.	ΔQ=·2026×360− 39·7727=33·1633	
”	ΔQ=·2200×410− 50·3447=39·8553	+1·64
61°21′N 3°10′W.	ΔQ=·1934×410− 45·2523=34·0417	
”	ΔQ=·2102×490− 61·3963=41·6017	−6·24
61°14′N 2°40′W.	ΔQ=·2810×490− 73·9302=63·7598	
”	ΔQ=·3030×580−100·2442=75·4958	−6·88
61°08′N 2°10′W.	ΔQ=·3641×580−111·2661=99·9119	
”	ΔQ=·2367×355− 42·8001=41·2284	+0·62
61°01′N 1°36′W.	ΔQ=·2228×355− 40·0573=39·0367	
”	ΔQ=·0847×130− 5·6593= 5·3517	+0·28
60°56′N 1°00′W.	ΔQ=·0702×130− 4·7495= 4·3765	
		−13·22

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m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
			62°00′N 6°12′W			16.6.51
			120 m.			-2210
0	7·92	35·26	27·52	58		
10	·89	·26	·52	58	·0058	
30	·65	·26	·56	54	·0170	
50	·63	·26	·56	55	·0279	
75	·50	·26	·58	53	·0414	
115	·50	·26	·58	54	·0548	
[195]				50	·0964	8·8227
			61°49′N 5°21′W			9.6.51
			179 m.			0345-0420
0	8·20	35·33	27·52	58		
10	·20	·32	·51	59	·0058	
30	·12	·34	·54	56	·0173	
50	7·62	·32	·61	50	·0279	
75	·60	·32	·61	51	·0405	
100	·38	·31	·64	48	·0529	
150	6·96	·29	·68	45	·0761	
173	·95	·31	·70	44		
[195]				39	·0950	9·8243
[200]				38	·0969	
[227]				30	·1061	13·0446
			61°42½′N 4°51′W			9.6.51
			274 m.			0030-0050
0	8·30	35·33	27·50	60		
10	·26	·32	·50	60	·0060	
30	7·58	·31	·61	50	·0170	
50	·00	·26	·65	46	·0266	
75	6·39	·26	·73	39	·0372	
100	·03	·25	·77	36	·0466	
150	4·86	·15	·83	30	·0631	
200	3·02	·06	·94	19	·0753	
[227]				18	·0803	10·8441
270	2·52	·04	·98	16	·0876	
[300]				15	·0922	
[330]				13	·0964	19·9799
			61°35′N 4°15′W			8.6.51
			910 m.			
0	9·27	35·40	27·40	69		
10	·24	·41	·42	67	·0068	
30	8·24	·35	·53	57	·0192	
50	7·85	·34	·58	53	·0302	
75	·73	·34	·61	51	·0432	
100	·52	·34	·64	48	·0556	
150	·00	·32	·70	43	·0784	
200	6·45	·30	·75	39	·0989	
300	4·84	·16	·84	31	·1339	
[330]				26	·1425	26·5090
400	1·61	34·98	28·00	14	·1564	
[435]				12	·1610	46·5785
500	0·35	·95	·06	7		
			61°28′N 3°42′W			8.6.51
			1250 m.			1625-1630
0	9·38	35·40	37·38	71		
10	·34	·40	·39	70	·0070	
30	·23	·40	·41	69	·0209	
50	8·74	·39	·48	63	·0341	
75	·38	·36	·51	60	·0495	
100	·10	·35	·55	57	·0641	
150	7·31	·30	·63	50	·0909	
200	6·87	·26	·66	48	·1154	
300	5·96	·26	·78	38	·1584	
400	3·07	·08	·97	18	·1864	
[435]				17	·1925	49·9223
500	1·66	34·98	28·01	14	·2024	62·7315
600	0·28	·97	·09	4		
			61°21′N 3°10′W			8.6.51
			1290 m.			1211-1215
0	9·14	35·42	27·44	65		
10	·12	·42	·44	66	·0066	
30	8·91	·40	·46	64	·0196	
50	·63	·40	·50	61	·0321	
75	·52	·38	·51	60	·0472	
100	·16	·38	·57	55	·0616	
150	7·93	·35	·58	55	·0891	
200	·57	·35	·64	50	·1153	
300	6·82	·31	·71	45	·1628	
400	5·81	·24	·78	39	·2048	
[455]				29	·2235	56·1039
500	2·66	·01	·95	20	·2343	66·2807
600	0·48	34·96	28·07	6		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_o^{z_1}\Delta D dz$
61°14′N 2°40′W 910-970 m.						8.6.51 0745-0853
0	9·03	35·35	27·40	69		
10	·03	·36	·41	68	·0068	
30	8·30	·36	·52	58	·0194	
50	·03	·34	·55	56	·0308	
75	7·61	·34	·62	50	·0440	
100	·20	·32	·67	45	·0559	
150	6·68	·26	·69	44	·0781	
200	·26	·26	·74	40	·0991	
300	4·36	·14	·88	27	·1326	
400	1·80	34·98	28·00	14	·1531	
[455]				8	·1591	45·2173
500	–0·18	·95	·10	3	·1616	
[516]				3	·1621	54·9564
600	·42	·92	·08	4		
61°08′N 2°10′W 544 m.						8.6.51 0445-0515
0	9·78	35·40	27·32	77		
10	·74	·42	·34	75	·0076	
30	·67	·44	·37	73	·0224	
50	·36	·44	·42	68	·0365	
75	8·83	·42	·49	62	·0527	
100	·66	·41	·51	61	·0681	
150	·60	·40	·51	62	·0989	
200	·51	·36	·49	64	·1304	
300	7·64	·31	·58	57	·1909	
[355]				51	·2206	40·8407
400	6·84	·31	·71	46	·2424	
500	5·84	·24	·78	40	·2854	
[516]				38	·2916	82·1955
535	4·86	·14	·82	35		
61°01′N 1°36′W 162 m.						8.6.51 0155-0210
0	9·53	35·33	27·31	78		
10	·38	·34	·34	75	·0076	
30	·04	·40	·44	66	·0217	
50	8·99	·40	·45	65	·0348	
75	·63	·40	·50	61	·0506	
100	·48	·37	·51	61	·0658	
[132]				60	·0852	5·8295
159	·08	·34	·54	59	·1013	
[200]				58	·1253	
[300]				55	·1818	
[355]				51	·2110	39·1496
60°53′N 1°06′W 102 m.						7.6.51 1025-1035
0	8·33	35·29	27·47	62		
10	·33	·27	·45	65	·0064	
30	·11	·28	·49	61	·0190	
50	7·45	·31	·62	49	·0300	
75	·10	·30	·66	46	·0419	
99	·09	·26	·64	48	·0884	
[132]				55	·1054	6·4361

VOLUME TRANSPORT

			Km³/hr.
62°00′N	6°12′W.	ΔQ=·0964×195− 8·8227= 9·9753	+ 0·36
61°49′N	5°21′W.	ΔQ=·0950×195− 9·8243= 8·7007	
	”	ΔQ=·1061×227−13·0446=11·0401	+ 1·03
61°42½′N	4°51′W.	ΔQ=·0803×227−10·8441= 7·3840	
	”	ΔQ=·0964×330−19·9799=11·8321	− 2·44
61°35′N	4°15′W.	ΔQ=·1425×330−26·5090=20·5160	
	”	ΔQ=·1610×435−46·5785=23·4565	− 2·91
61°28′N	3°42′W.	ΔQ=·1925×435−49·9223=33·8152	
	”	ΔQ=·2024×500−62·7315=38·4685	− 3·49
61°21′N	3°10′W.	ΔQ=·2343×500−66·2807=50·8693	
	”	ΔQ=·2235×455−56·1039=45·5886	+ 5·20
61°14′N	2°40′W.	ΔQ=·1591×455−45·2173=27·1732	
	”	ΔQ=·1621×516−54·9564=28·6872	−11·16
61°08′N	2°10′W.	ΔQ=·2916×516−82·1955=68·2701	
	”	ΔQ=·2206×355−40·8407=37·4723	+ 0·48
61°01′N	1°36′W.	ΔQ=·2110×355−39·1496=35·7554	
	”	ΔQ=·0852×132− 5·8295= 5·4169	− 0·58
60°53′N	1°06′W.	ΔQ=·1054×132− 6·4361= 7·4767	
			−13·51

FAROE BANK—BUTT OF LEWIS

F.R.S. *SCOTIA*

16-17 June, 1951

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_o^{z_1}\Delta D dz$
NNW. 3-4. 60°54′N 8°16′W 156 m.						17.6.51 2135-2230
0	9·46	35·35	27·34	75		
10	·51	·34	·32	77	·0076	
20	·53	·34	·31	78	·0154	
30	·47	·35	·34	75	·0230	
50	·09	·35	·40	70	·0375	
75	8·65	·32	·44	67	·0546	
100	·43	·28	·45	66	·0712	
150	·43	·27	·44	68	·1047	
[200]				67	·1385	
[250]				67	·1720	
[300]				63	·2045	
[400]				45	·2585	
[500]				23	·2925	
[550]				10	·3007	96·8562
NNW. 4. 60°45′N 8°08′W 869 m.						17.6.51 1925-2000
0	9·89	35·33	27·25	83		
10	·89	·31	·23	85	·0084	
20	·53	·31	·29	80	·0166	
30	·53	·34	·32	77	·0244	
50	·22	·34	·37	73	·0394	
75	00	·34	·40	71	·0574	
100	8·88	·34	·42	69	·0749	
150	·74	·33	·44	68	·1091	
200	·59	·32	·46	67	·1429	
250	·49	·32	·47	67	·1764	
300	·28	·32	·50	65	·2094	
400	6·85	·25	·66	51	·2674	
[500]	3·50	·02	·88	28	·3069	
[550]	1·55	·00	28·03	12	·3169	100·5513
600	0·47	34·99	·09	5		

NE. 4-5. 60°35′N 8°00′W 17.6.51
900 m. 1705-1800

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·07	35·29	27·19	89		
10	·06	·31	·20	88	·0088	
20	·06	·34	·22	87	·0176	
30	9·95	·32	·23	86	·0262	
50	·55	·30	·28	82	·0430	
75	·18	·35	·40	71	·0621	
100	·04	·44	·47	65	·0791	
150	8·94	·34	·41	71	·1131	
200	·80	·32	·42	71	·1486	
250	·74	·32	·42	72	·1844	
300	·70	·32	·43	72	·2204	
400	·58	·31	·44	73	·2929	
[500]	7·40	·23	·57	62	·3604	
[550]	4·00	·10	·88	29	·3832	110·8783
587	–0·03	34·92	28·06	6		

NE. 4-5. 60°23½′N 7°49½′W 17.6.51
770 m. 1505-1540

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·82	35·27	27·21	87		
10	·81	·27	·21	87	·0087	
20	·81	·32	·25	84	·0173	
30	·81	·28	·22	87	·0259	
50	·75	·29	·24	85	·0431	
75	·34	·31	·32	78	·0635	
100	8·92	·32	·40	71	·0821	
150	·75	·30	·40	72	·1179	
200	·62	·29	·42	71	·1537	
250	·61	·29	·42	72	·1895	
300	·60	·30	·43	72	·2255	
400	·07	·29	·50	67	·2950	
[500]	5·82	·12	·69	49	·3530	
[550]	4·05	·02	·82	35	·3740	111·5770
600	2·18	34·95	·94	21		

NE. 3-4. 60°12′N 7°40′W 17.6.51
622 m. 1150-1330

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·93	35·36	27·26	82		
10	·94	·35	·26	83	·0082	
20	·94	·36	·26	83	·0165	
30	·90	·36	·27	82	·0247	
50	·83	·35	·27	83	·0412	
75	·28	·35	·37	74	·0608	
100	·15	·31	·36	75	·0794	
150	8·96	·35	·42	70	·1156	
200	·80	·34	·43	70	·1506	
250	·69	·25	·38	76	·1871	
300	·63	·26	·39	76	·2251	
400	·53	·27	·42	75	·3006	
[493]	·47	·27	·43			
[500]	·46	·27	·43	76	·3761	
[550]	·43	·27	·43	77	·4143	114·2145

NNE. 3. 59°56′N 7°27′W 17.6.51
750 m. 0920-0950

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·34	35·37	27·20	88		
10	·31	·37	·20	88	·0088	
20	·16	·36	·22	87	·0176	
30	·14	·35	·22	87	·0263	
50	9·80	·35	·28	82	·0432	
75	·30	·36	·37	74	·0627	
100	·16	·36	·39	72	·0809	
150	8·94	·36	·43	69	·1161	
200	·80	·34	·43	70	·1509	
250	·80	·31	·41	73	·1867	
300	·77	·33	·43	72	·2229	
400	·63	·33	·45	72	·2949	
[500]	·60	·31	·44	75	·3684	
[550]	·58	·31	·44	76	·4062	112·9093
600	·54	·31	·45	76		

Calm 59°44′N 7°15′W 16/17.6.51
1066 m. 2345-0120

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·66	35·42	27·18	90		
10	·27	·35	·20	88	·0089	
20	·14	·35	·22	87	·0177	
30	9·97	·39	·28	81	·0261	
50	·73	·35	·29	81	·0423	
75	·44	·43	·40	71	·0613	
100	·06	·35	·40	71	·0791	
150	8·93	·35	·42	70	·1143	
200	·87	·35	·42	71	·1495	
250	·78	·43	·51	64	·1833	
300	·71	·42	·51	65	·2155	
400	·66	·34	·46	71	·2835	
[500]				72	·3550	
[550]				73	·3912	109·3805
800	·48	·36	·50	75		

Calm 59°31′N 7°05′W 16.6.51
1018 m. 2120-2230

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·16	35·27	26·97	110		
10	10·52	·28	27·10	98	·0104	
20	·43	·26	·09	99	·0202	
30	·40	·26	·10	98	·0300	
50	9·93	·37	·27	83	·0481	
75	·30	·35	·36	75	·0679	
100	·07	·35	·40	71	·0861	
150	8·98	·37	·43	69	·1211	
200	·91	·34	·42	71	·1561	
250	·84	·36	·45	69	·1911	
300	·77	·37	·47	68	·2253	
400	·69	·35	·46	71	·2948	
[500]				75	·3678	
[550]				77	·4058	114·2870
600	·65	·29	·42	79		

Calm 59°17′N 6°53′W 16.6.51
586 m. 1840-1955

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·55	35·10	26·77	129		
10	10·75	·18	·98	109	·0119	
20	·52	·20	27·04	104	·0225	
30	·12	·26	·15	94	·0324	
50	9·82	·28	·22	87	·0505	
75	·55	·27	·26	84	·0719	
100	·33	·35	·36	75	·0918	
150	·23	·33	·37	75	·1293	
200	·15	·31	·36	77	·1673	
250	·08	·32	·38	76	·2055	
300	·05	·31	·37	78	·2440	
[350]				80	·2835	51·5987
400	8·91	·27	·36	81	·3235	
[500]				81	·4045	
[550]				81	·4450	124·4237

Var. 1. 59°00′N 6°40′W 16.6.51
148 m. 1525-1615

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·82	34·93	26·77	129		
10	·34	·91	·84	122	·0126	
20	·16	·95	·91	116	·0245	
30	9·43	35·01	27·07	101	·0353	
50	8·33	·27	·46	64	·0518	
75	·06	·15	·40	71	·0687	
100	·04	·17	·42	69	·0862	
125	·12	·17	·41	70	·1036	
[132]				70	·1085	7·9758
145	·12	·20	·43	69	·1175	
[200]				73	·1565	
[250]				79	·1945	
[300]				80	·2343	
[350]				80	·2743	49·1894

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
SW. 1.			58°50′N 6°26′W			16.6.51
			117 m.			1320-1350
0	10·72	34·95	26·80	126		
10	·35	·85	·79	127	·0126	
20	·17	·88	·85	122	·0250	
30	·01	·89	·88	119	·0370	
50	8·05	35·08	27·35	75	·0564	
75	7·97	·12	·39	71	·0746	
100	·99	·10	·37	74	·0927	
115	·99	·11	·38	73	·1037	6·6967
[132]				70	·1159	8·5633
Var. 1-2.			58°40′N 6°10′W			16.6.51
			113 m.			1105-1205
0	10·19	34·95	26·90	117		
10	·14	·90	·87	120	·0118	
20	·11	·88	·86	121	·0238	
30	9·73	·93	·95	112	·0354	
50	8·31	35·10	27·25	84	·0550	
75	7·93	·04	·31	79	·0754	
100	·91	·08	·31	79	·0952	
111	·93	·00	·30	81	·1040	
[115]				81	·1072	6·7175

VOLUME TRANSPORT

		Km³/hr.
60°54′N 8°16′W.	△Q=·3007×550− 96·8562= 68·5288	
		− 1·47
60°45′N 8°08′W.	△Q=·3169×550−100·5513= 73·7437	
		− 7·40
60°35′N 8°00′W.	△Q=·3832×550−110·8783= 99·8817	
		+ 1·63
60°23½′N 7°49½′W.	△Q=·3740×550−111·5770= 94·1230	
		− 5·55
60°12′N 7°40′W.	△Q=·4143×550−114·2145=113·6505	
		+ 0·90
59°56′N 7°27′W.	△Q=·4062×550−112·9093=110·5007	
		+ 1·35
50°44′N 7°15′W.	△Q=·3912×550−109·3805=105·7795	
		− 0·89
59°31′N 7°05′W.	△Q=·4058×550−114·2870=108·9030	
		− 3·27
59°17′N 6°53′W.	△Q=·4450×550−124·4237=120·3263	
”	△Q=·2835×350− 51·5987= 47·6263	
		+ 0·23
59°00′N 6°40′W.	△Q=·2743×350− 49·1894= 46·8156	
”	△Q=·1085×132− 7·9758= 6·3462	
		− 0·11
58°50′N 6°26′W.	△Q=·1159×132− 8·5633= 6·7355	
”	△Q=·1037×115− 6·6967= 5·2288	
		− 0·11
58°40′N 6°10′W.	△Q=·1072×115− 6·7175= 5·6105	
		−14·69

FAROE BANK—BUTT OF LEWIS

F.R.S. *EXPLORER*

13-15 July, 1951

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
NW. 3.			60°54′N 8°16′W			15.7.51
			125 m.			0605-0640
0	10·52	35·28	27·10	98		
10	·51	·28	·10	98	·0098	
20	·50	·28	·10	98	·0196	
30	·50	·28	·10	98	·0294	
50	·40	·28	·12	97	·0489	
75	9·54	·30	·28	82	·0713	
100	10·14	·31	·19	90	·0928	
110	·52	·28	·10	100	·1023	
[150]				91	·1405	
[200]				92	·1863	
[300]				87	·2758	
[400]				69	·3538	
[500]				48	·4123	
[550]				41	·4345	132·8392

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
W. 4.			60°45′N 8°08′W			15.7.51
			—			0120-0230
0	10·99	35·24	26·98	109		
10	·99	·26	27·00	107	·0108	
20	·49	·29	·11	97	·0210	
30	·03	·31	·21	88	·0302	
50	9·54	·27	·26	83	·0473	
75	10·88	·32	·07	102	·0704	
100	·00	·30	·20	90	·0944	
150	9·41	·30	·30	82	·1374	
200	10·16	·32	·19	93	·1812	
[300]	8·76	·29	·31	84	·2697	
[400]	7·53	·19	·52	65	·3442	
[500]	5·25	·10	·74	43	·3982	
[550]	4·57	·05	·78	39	·4187	129·3178
W. 5.			60°35′N 8°00′W			14.7.51
			—			2245-2400
0	11·04	35·32	27·03	104		
10	·04	·26	26·99	108	·0106	
20	·05	·31	27·02	106	·0213	
30	10·03	·32	·22	87	·0309	
50	8·96	·29	·37	73	·0469	
75	9·03	·26	·33	77	·0657	
100	8·93	·26	·35	76	·0848	
150	·76	·24	·36	76	·1228	
200	·74	·30	·41	72	·1598	
300	·56	·25	·40	75	·2333	
400	6·62	·15	·62	54	·2978	
[500]	4·80	·07	·78	39	·3443	
[550]	·32	·05	·82	35	·3628	112·7878
SW. 3.			60°23½′N 7°49½′W			14.7.51
			—			1955-2115
0	10·63	35·19	27·01	106		
10	·63	·25	·05	102	·0104	
20	·48	·26	·09	99	·0204	
30	·08	·25	·15	94	·0300	
50	9·88	·24	·18	91	·0485	
75	8·65	·24	·38	72	·0689	
100	·41	·22	·40	71	·0868	
150	7·85	·26	·53	60	·1196	
200	·06	·17	·58	55	·1484	
300	6·06	·09	·64	51	·2014	
400	5·01	·07	·75	41	·2474	
[500]	4·06	34·92	·74	42	·2889	
[550]	3·71	·88	·74	42	·3099	98·2318
SW. 3.			60°12′N 7°40′W			14.7.51
			500 m.			1640-1815
0	11·60	35·32	26·93	114		
10	·48	·28	·92	115	·0114	
20	·09	·29	·99	108	·0226	
30	10·33	·29	27·14	94	·0327	
50	9·49	·35	·33	77	·0498	
75	·05	·31	·37	73	·0686	
100	·00	·29	·36	75	·0871	
150	·01	·30	·37	75	·1246	
200	8·77	·26	·38	75	·1621	
300	·64	·26	·39	76	·2376	
400	·55	·25	·40	77	·3141	
500	·23	·27	·47	72	·3886	
[550]	4·50	·28	·99	19	·4114	119·9198

NW. 2. 59°56′N 7°27′W 14.7.51
500 m. 1230-1530

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	11·63	35·33	26·93	114		
10	·55	·37	·97	110	·0112	
20	·23	·38	27·04	104	·0219	
30	·13	·31	·02	106	·0324	
50	10·25	·35	·20	89	·0519	
75	9·73	·34	·28	82	·0733	
100	·25	·30	·33	78	·0933	
150	8·87	·26	·36	76	·1318	
200	·80	·29	·39	74	·1693	
300	·63	·28	·41	74	·2433	
400	·33	·27	·45	72	·3163	
500	7·87	·26	·52	67	·3858	
[550]	·62	·25	·56	64	·4186	121·9630

NW. 2. 59°44′N 7°15′W 14.7.51
1121 m. 0835-1105

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	12·10	35·27	26·80	126		
10	·01	·27	·81	125	·0126	
20	11·51	·31	·94	113	·0245	
30	·47	·30	·94	113	·0358	
50	10·12	·30	27·18	91	·0562	
75	9·38	·31	·31	79	·0774	
100	·26	·31	·34	77	·0969	
150	·06	·30	·36	76	·1351	
200	·01	·32	·38	75	·1729	
300	8·80	·26	·37	78	·2494	
400	·76	·26	·38	79	·3279	
500	·71	·24	·37	82	·4084	
[550]				81	·4492	127·0538
600	·67	·30	·42	79		

NW. 2. 59°31′N 7°05′W 14.7.51
1072 m. 0432-0640

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	12·38	35·35	26·80	126		
10	·35	·35	·81	125	·0126	
20	11·89	·31	·87	120	·0248	
30	·79	·27	·86	121	·0368	
50	10·03	·35	27·24	85	·0574	
75	9·54	·33	·30	80	·0780	
100	·35	·30	·31	80	·0980	
150	·11	·32	·37	75	·1368	
200	8·94	·27	·36	77	·1748	
300	·81	·28	·38	77	·2518	
400	·79	·31	·41	76	·3283	
[500]				76	·4043	
[550]				77	·4425	127·1875
600	·58	·30	·44	77		

N. 2. 59°17′N 6°53′W 14.7.51
416 m. 0145-0245

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	12·12	35·04	26·61	144		
10	11·79	·00	·65	140	·0142	
20	·59	·00	·68	138	·0281	
30	10·94	·18	27·04	104	·0402	
50	·00	·35	·24	85	·0591	
75	9·69	·35	·30	80	·0797	
100	·55	·36	·33	78	·0995	
150	·46	·32	·31	81	·1393	
200	·43	·35	·33	80	·1795	
[285]				76	·2458	37·6072
300	·09	·35	·40	75	·2570	
400	8·98	·35	·41	76	·3325	
[500]				76	·4085	
[550]				77	·4467	129·2620

N. 1. 59°00′N 6°40′W 13.7.51
155 m. 2300-2335

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	12·40	34·99	26·52	152		
10	11·74	·98	·64	141	·0146	
20	·63	·97	·65	141	·0287	
30	·33	35·00	·73	133	·0424	
50	10·53	·18	27·01	107	·0664	
75	9·12	·30	·35	75	·0892	
100	8·75	·31	·42	69	·1072	
[140]				70	·1350	10·9770
150	·76	·31	·42	70	·1420	
[200]				76	·1785	
[285]				76	·2431	38·2935

N. 2. 58°50′N 6°26′W 13.7.51
123 m. 2050-2125

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	12·39	34·86	26·42	162		
10	11·83	·88	·54	151	·0156	
20	·53	·85	·57	148	·0306	
30	10·29	35·01	·93	114	·0437	
50	8·69	·08	27·25	84	·0635	
75	·59	·18	·34	76	·0835	
100	·61	·22	·37	74	·1023	
120	·62	·30	·43	69	·1166	
[123]				69	·1187	8·4540
[140]				70	·1305	10·5722

N. 1. 58°40′N 6°10′W 13.7.51
124 m. 1845-1910

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	12·18	34·86	26·46	158		
10	11·64	·79	·52	153	·0156	
20	·32	·82	·59	146	·0306	
30	·26	·81	·60	146	·0452	
50	8·46	·97	27·20	89	·0687	
75	·04	35·00	·28	82	·0901	
100	7·91	·08	·38	73	·1095	
120	·87	·02	·34	77	·1245	
[123]				77	·1267	9·0233

VOLUME TRANSPORT

			Km³/hr.
60°54′N	8°16′W.	$\triangle Q = \cdot4345 \times 550 - 132\cdot8392 - 106\cdot1358$	+ 1·46
60°45′N	8°08′W.	$\triangle Q = \cdot4187 \times 550 - 129\cdot3178 = 100\cdot9672$	+ 4·03
60°35′N	8°00′W.	$\triangle Q = \cdot3628 \times 550 - 112\cdot7878 = 86\cdot7522$	+ 4·33
60°23½′N	7°49½′W.	$\triangle Q = \cdot3099 \times 550 - 98\cdot2318 = 72\cdot2312$	−10·17
60°12′N	7°40′W.	$\triangle Q = \cdot4144 \times 550 - 119\cdot9198 = 108\cdot0002$	− 0·08
59°56′N	7°27′W.	$\triangle Q = \cdot4186 \times 550 - 121\cdot9630 = 108\cdot2670$	− 3·35
59°44′N	7°15′W.	$\triangle Q = \cdot4492 \times 550 - 127\cdot0538 = 120\cdot0062$	+ 1·09
59°31′N	7°05′W.	$\triangle Q = \cdot4425 \times 550 - 127\cdot1875 = 116\cdot1875$	
59°17′N	6°53′W.	$\triangle Q = \cdot4467 \times 550 - 129\cdot2620 = 116\cdot4230$	− 0·07
”		$\triangle Q = \cdot2458 \times 285 - 37\cdot6072 = 32\cdot4458$	+ 0·42
59°00′N	6°40′W.	$\triangle Q = \cdot2431 \times 285 - 38\cdot2935 = 30\cdot9900$	
”		$\triangle Q = \cdot1350 \times 140 - 10\cdot9770 = 7\cdot9230$	+ 0·07
58°50′N	6°26′W.	$\triangle Q = \cdot1305 \times 140 - 10\cdot5722 = 7\cdot6978$	
”		$\triangle Q = \cdot1187 \times 123 - 8\cdot4540 = 6\cdot1461$	− 0·12
58°40′N	6°10′W.	$\triangle Q = \cdot1267 \times 123 - 9\cdot0233 = 6\cdot5608$	
59°17′N	6°53′W.	$\triangle Q = \cdot0281 \times 20 - 0\cdot2825 = 0\cdot2795$	− 0·00*
59°00′N	6°40′W.	$\triangle Q = \cdot0287 \times 20 - 0\cdot2895 = 0\cdot2845$	
”		$\triangle Q = \cdot0424 \times 30 - 0\cdot6450 = 0\cdot6270$	− 0·00*
58°50′N	6°26′W.	$\triangle Q = \cdot0437 \times 30 - 0\cdot6805 = 0\cdot6305$	
”		$\triangle Q = \cdot0635 \times 50 - 1\cdot7525 = 1\cdot4225$	− 0·01*
58°40′N	6°10′W.	$\triangle Q = \cdot0687 \times 50 - 1\cdot8270 = 1\cdot6080$	
			− 2·38

*Since this is not by definition oceanic water (see Figure 65), but has been included as such in the preceding computation, it is treated in the aggregate as if its sign were positive instead of negative.

NOLSØ, FAROE—FLUGGA, SHETLAND
F.R.S. *EXPLORER*
23-25 July, 1951

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
W. 3.		62°00′N 6°12′W				23.7.51
			128 m.			1600-1655
0	9·64	35·17	27·16	92		
10	·12	·18	·26	83	·0088	
20	8·94	·21	·31	78	·0168	
30	·94	·22	·32	77	·0246	
50	·93	·22	·32	78	·0401	
75	·93	·21	·31	79	·0597	
100	·94	·22	·32	79	·0795	
125	·95	·20	·30	81	·0995	
[150]				73	·1187	
[200]				56	·1509	15·7185
W. 2.		61°54′N 5°45′W				23.7.51
			272 m.			1832-1910
0	10·76	35·25	27·03	104		
10	·48	·26	·09	99	·0102	
20	·28	·26	·12	96	·0200	
30	·16	·26	·14	94	·0295	
50	9·93	·27	·19	90	·0479	
75	8·52	·25	·40	71	·0680	
100	7·85	·23	·51	61	·0845	
150	·15	·25	·63	50	·1123	
200	·16	·20	·59	54	·1383	15·7635
[220]				54	·1491	18·6375
265	·16	·22	·60	54		
WSW. 2.		61°49′N 5°21′W				24.7.51
			165 m.			0001-0055
0	10·45	35·25	27·08	99		
10	·30	·25	·11	97	·0098	
20	9·98	·26	·18	90	·0192	
30	·80	·28	·22	87	·0280	
50	·14	·28	·33	77	·0444	
75	8·73	·26	·38	73	·0632	
100	7·56	·24	·56	56	·0793	
125	·47	·21	·54	58	·0935	
[150]				57	·1079	
[200]				54	·1357	
[210]				54	·1411	16·4317
[220]				54	·1465	17·8697
SW. 2.		61°42′N 4°51′W				24.7.51
			252 m.			0300-0345
0	11·03	35·25	26·98	109		
10	·03	·26	·99	108	·0108	
20	10·82	·26	27·03	105	·0214	
30	·17	·29	·17	92	·0312	
50	9·32	·31	·33	77	·0481	
75	8·71	·30	·41	70	·0665	
100	·35	·27	·45	66	·0835	
150	7·70	·26	·56	57	·1143	
200	·36	·26	·60	54	·1421	
[210]				54	·1475	17·3815
245	·35	·23	·58	56	·1667	
[300]				50	·1959	
[400]				41	·2414	
[465]				34	·2658	71·2005

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SW. 2.			61°35′N 4°15′W			24.7.51
			1114 m.			0555-0835
0	11·15	35·25	26·96	111		
10	·20	·25	·95	112	·0112	
20	·22	·25	·95	112	·0224	
30	·15	·23	·95	112	·0336	
50	10·28	·27	27·13	96	·0544	
75	9·44	·26	·26	84	·0769	
100	8·80	·33	·42	69	·0960	
150	·73	·26	·38	74	·1318	
200	·02	·21	·45	68	·1673	
300	7·53	·19	·52	63	·2328	
400	6·75	·13	·58	58	·2933	
[465]				43	·3261	84·7994
500	4·30	·05	·82	35	·3397	
[560]				26	·3580	117·3819
600	1·54	34·89	·94	20		
SW. 3.			61°28′N 3°42′W			24.7.51
			>1280 m.			1050-1305
0	11·93	35·30	26·85	121		
10	·51	·25	·89	118	·0120	
20	10·71	·30	27·08	100	·0229	
30	9·94	·33	·24	85	·0321	
50	·33	·35	·35	75	·0481	
75	·09	·33	·38	73	·0666	
100	8·98	·35	·41	70	·0845	
150	·78	·35	·45	67	·1187	
200	·67	·34	·46	67	·1522	
300	·36	·34	·50	65	·2182	
400	7·38	·28	·52	65	·2832	
[490]				36	·3286	87·6066
500	4·75	·14	·84	33	·3320	
[560]				22	·3485	111·3246
600	1·95	34·99	28·00	15		
SW. 3.			61°21′N 3°10′W			24.7.51
			1302 m.			1455-1655
0	12·02	35·26	26·81	125		
10	11·38	·26	·93	114	·0120	
20	10·44	·30	27·13	95	·0224	
30	9·33	·30	·32	77	·0310	
50	8·34	·28	·46	64	·0451	
75	·13	·26	·47	64	·0611	
100	7·91	·26	·51	61	·0767	
150	·75	·26	·54	59	·1067	
200	·50	·23	·56	57	·1357	
300	6·61	·21	·66	49	·1887	
400	3·08	34·97	·88	27	·2267	
[430]				22	·2341	58·8570
[490]				11	·2440	73·2000
500	0·51	·92	28·04	9		
SW. 2.			61°14′N 2°40′W			24.7.51
			812 m.			1850-2030
0	12·35	35·28	26·75	131		
10	11·20	·25	·95	112	·0122	
20	10·83	·31	27·06	102	·0229	
30	·31	·28	·13	95	·0327	
50	9·37	·33	·33	77	·0499	
75	8·95	·33	·40	71	·0684	
100	·86	·32	·41	70	·0860	
150	·70	·34	·45	67	·1202	
200	·17	·30	·50	63	·1527	
300	7·16	·30	·66	50	·2092	
400	5·40	·19	·80	37	·2527	
[430]				34	·2633	65·6568
[465]				30	·2745	75·0683
500	2·67	34·92	·88	27		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
SW. 3.			61°08′N 2°10′W			24.7.51
			305 m.			2225-2335
0	12·54	35·28	26·71	135		
10	11·63	·28	·89	118	·0126	
20	10·91	·31	27·05	103	·0236	
30	·09	·30	·19	90	·0332	
50	9·47	·30	·29	81	·0503	
75	8·94	·30	·38	73	·0695	
100	·91	·30	·39	72	·0876	
150	·76	·32	·42	70	·1231	
200	·61	·28	·42	71	·1583	
[235]				69	·1828	22·5960
290	·14	·27	·48	67	·2202	
[400]				58	·2890	
[465]				51	·3244	81·6200
SW. 3.			61°01′N 1°36′W			25.7.51
			168 m.			0200-0240
0	12·09	35·29	26·81	125		
10	·08	·26	·79	127	·0126	
20	11·66	·29	·90	117	·0248	
30	·23	·34	27·01	107	·0360	
50	10·30	·34	·18	91	·0558	
75	9·50	·35	·33	77	·0768	
100	·16	·35	·38	73	·0956	
[140]				70	·1242	9·6805
160	8·41	·28	·44	68	·1380	
[200]				70	·1656	
[235]				70	·1901	24·5993
SSW. 4.			60°56′N 1°00′W			25.7.51
			115 m.			0445-0600
0	12·05	35·26	26·80	126		
10	11·85	·23	·81	125	·0126	
20	·38	·26	·93	114	·0246	
30	10·48	·28	27·10	98	·0352	
50	8·24	·24	·44	66	·0516	
75	7·94	·25	·49	62	·0676	
100	·95	·26	·50	62	·0831	
[140]				62	·1079	8·6098

VOLUME TRANSPORT

		Km.³/hr.
62°00′N 6°12′W.	ΔQ=·1509×200— 15·7185=14·4615	+0·72
61°54′N 5°45′W.	ΔQ=·1383×200— 15·7635=11·8965	
”	ΔQ=·1491×220— 18·6375=14·1645	−0·05
61°49′N 5°21′W.	ΔQ=·1465×220— 17·8697=14·3603	
”	ΔQ=·1411×210— 16·4317=13·1993	−0·11
61°42′N 4°51′W.	ΔQ=·1475×210— 17·3815=13·5935	
”	ΔQ=·2658×465— 71·2005=52·3965	−4·05
61°35′N 4°15′W.	ΔQ=·3261×465— 84·7994=66·8371	
”	ΔQ=·3580×560—117·3819=83·0981	−0·21
61°28′N 3°42′W.	ΔQ=·3485×560—111·3246=83·8354	
”	ΔQ=·3286×490— 87·6066=73·4074	+7·61
61°21′N 3°10′W.	ΔQ=·2440×490— 73·2000=46·3600	
”	ΔQ=·2341×430— 58·8570=41·8060	−1·62
61°14′N 2°40′W.	ΔQ=·2633×430— 65·6568=47·5622	
”	ΔQ=·2745×465— 75·0683=52·5742	−4·69
61°08′N 2°10′W.	ΔQ=·3244×465— 81·6200=69·2260	
”	ΔQ=·1828×235— 22·5960=20·3620	+0·08
61°01′N 1°36′W.	ΔQ=·1901×235— 24·5993=20·0742	
”	ΔQ=·1242×140— 9·6805= 7·7075	+0·34
60°56′N 1°00′W.	ΔQ=·1079×140— 8·6098= 6·4962	
		−1·98

FAROE BANK—BUTT OF LEWIS

F.R.S. *SCOTIA*

15-16 August, 1951

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
SSE. 6.			60°35′N 8°00′W			16.8.51
			879 m.			2050-2145
0	11·34	35·35	27·00	107		
10	·33	·35	·00	107	·0107	
20	·32	·36	·01	107	·0214	
30	·30	·36	·01	107	·0321	
50	10·16	·35	·21	88	·0516	
75	9·20	·35	·38	73	·0717	
100	·15	·35	·38	73	·0899	
150	·08	·36	·40	72	·1261	
200	8·87	·35	·44	69	·1613	
300	·65	·30	·43	72	·2318	
400	·60	·28	·42	75	·3053	
500	7·71	·25	·54	65	·3753	
[550]				65	·4078	117·5822
600	·64	·25	·56	65		
SE/S. 6.			60°23½′N 7°49½′W			16.8.51
			878 m.			1835-1940
0	11·48	35·36	26·99	108		
10	·48	·35	·98	109	·0108	
20	·35	·35	27·00	108	·0216	
30	·05	·35	·06	102	·0321	
50	10·46	·35	·16	93	·0516	
75	·44	·35	·16	94	·0750	
100	9·61	·35	·31	80	·0968	
150	·14	·36	·39	73	·1350	
200	·08	·35	·40	73	·1715	
300	8·90	·35	·43	72	·2440	
400	·67	·35	·46	71	·3155	
500	7·93	·25	·51	68	·3850	
[550]				53	·4152	122·2890
600	5·00	·14	·81	38		
SSE. 4.			60°12′N 7°40′W			16.8.51
			622 m.			1615-1730
0	11·45	35·35	26·98	109		
10	·43	·35	·98	109	·0109	
20	·05	·35	27·06	102	·0214	
30	·06	·35	·06	102	·0316	
50	9·95	·35	·25	84	·0502	
75	·41	·35	·34	77	·0703	
100	·28	·40	·40	71	·0888	
150	·29	·36	·37	75	·1253	
200	·01	·35	·41	72	·1621	
300	8·80	·35	·44	71	·2336	
400	·69	·33	·44	73	·3056	
500	·46	·28	·44	75	·3796	
[550]				74	·4168	118·2465
600	·10	·27	·49	72		
SSW. 4.			59°56′N 7°27′W			16.8.51
			705 m.			1330-1445
0	11·69	35·35	26·94	113		
10	·65	·35	·95	112	·0112	
20	·55	·35	·96	111	·0224	
30	10·97	·36	27·08	100	·0330	
50	·76	·37	·12	97	·0527	
75	·66	·35	·13	97	·0769	
100	9·66	·35	·30	81	·0991	
150	·23	·36	·38	74	·1379	
200	·12	·35	·39	74	·1749	
300	8·91	·35	·42	73	·2484	
400	·70	·35	·46	71	·3204	
500	·58	·33	·46	73	·3924	
[550]				71	·4284	124·6880
650	7·91	·30	·54	68		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SSW. 3.			59°44′N 7°15′W 1042 m.			16.8.51 1045-1230
0	12·57	35·37	26·78	128		
10	·52	·37	·79	127	·0128	
20	·43	·38	·81	126	·0254	
30	·40	·38	·82	125	·0380	
50	11·52	·38	·99	109	·0614	
75	9·97	·37	27·26	84	·0855	
100	·52	·36	·33	78	·1057	
150	·34	·37	·37	75	·1439	
200	·25	·38	·39	74	·1811	
300	·06	·35	·40	75	·2556	
400	8·95	·35	·42	75	·3306	
500	·82	·35	·42	77	·4066	
[550]				76	·4448	129·4472
600	·65	·35	·46	75		
SW. 4.			59°31′N 7°05′W 1033 m.			16.8.51 0727-0900
0	12·62	35·36	26·76	130		
10	·62	·35	·76	130	·0130	
20	·62	·35	·76	130	·0260	
30	·62	·35	·76	130	·0390	
50	·52	·36	·78	129	·0649	
75	10·46	·38	27·18	92	·0925	
100	9·93	·37	·27	84	·1145	
150	·38	·36	·35	77	·1547	
200	·39	·38	·37	76	·1929	
300	·20	·35	·38	77	·2694	
400	·06	·37	·42	75	·3454	
500	8·87	·38	·45	74	·4199	
[550]				75	·4571	135·6440
600	·74	·36	·45	76		
SSW. 3-4.			59°17′N 6°53′W 522 m.			16.8.51 0500-0550
0	12·76	35·37	26·74	132		
10	·79	·37	·74	132	·0132	
20	·77	·68	·98	109	·0252	
30	·76	·35	·73	133	·0373	
50	10·54	·38	27·17	92	·0598	
75	9·98	·48	·35	76	·0808	
100	·77	·39	·31	80	·1003	
150	·55	·48	·42	70	·1378	
200	·45	·39	·37	76	·1743	
300	·24	·39	·40	75	·2498	
[340]				76	·2800	51·1188
400	·19	·37	·40	77	·3258	
500	·15	·37	·40	79	·4038	
[550]				79	·4433	126·9603
W. 2.			59°00′N 6°40′W .. 156 m.			16.8.51 0220-0310
0	11·83	35·03	26·66	139		
10	·81	·03	·67	139	·0139	
20	·78	·02	·67	139	·0278	
30	·78	·03	·67	139	·0417	
50	10·07	·03	·98	110	·0666	
75	9·52	·01	27·06	103	·0932	
100	·20	·32	·35	76	·1156	
[140]				74	·1456	11·5400
150	·17	·34	·38	74	·1531	
200				74	·1901	
[300]				74	·2641	
[340]				74	·2939	55·4835
W. 2.			58°50′N 6°26′W 121 m.			16.8.51 0035-0055
0	12·23	35·02	26·58	147		
10	·24	·03	·58	147	·0147	
20	·18	·03	·60	145	·0293	
[27]				141	·0393	0·5336
30	11·84	·04	·67	139	·0435	
50	9·44	·05	27·10	99	·0673	
75	·16	·25	·31	79	·0895	
100	·05	·28	·35	76	·1089	
115	·03	·28	·35	76	·1203	
[120]				76	·1241	8·5355
[140]				75	·1392	11·1675
WNW. 2.			58°40′N 6°10′W 117 m.			15.8.51 2145-
0	12·50	34·96	26·48	156		
10	·51	·94	·46	159	·0158	
20	·41	·94	·48	157	·0316	
[27]				156	·0426	0·5757
30	·33	·94	·49	156	·0472	
50	10·00	·99	·96	112	·0740	
75	9·05	35·07	27·18	91	·0994	
100	8·99	·12	·23	87	·1216	
110	·93	·30	·38	73	·1296	
[120]				72	·1375	9·4430

VOLUME TRANSPORT

		Km³/hr.
60°35′N 8°00′W.	△Q=·4078×550—117·5822=106·7078	+0·18
60°23½′N 7°49½′W.	△Q=·4152×550—122·2890=106·0710	−1·40
60°12′N 7°40′W.	△Q=·4168×550—118·2465=110·9935	+0·02
59°56′N 7°27′W.	△Q=·4284×550—124·6880=110·9320	−1·22
59°44′N 7°15′W.	△Q=·4448×550—129·4472=115·1928	−0·16
59°31′N 7°05′W.	△Q=·4571×550—135·6440=115·7610	−0·31
59°17′N 6°53′W.	△Q=·4433×550—126·9603=116·8547	
”	△Q=·2800×340— 51·1188= 44·0812	−0·10
59°00′N 6°40′W.	△Q=·2939×340— 55·4835= 44·4425	
”	△Q=·1456×140— 11·5400= 8·8440	+0·15
58°50′N 6°26′W.	△Q=·1392×140— 11·1675= 8·3205	
”	△Q=·1241×120— 8·5355= 6·3565	+0·14
58°40′N 6°10′W.	△Q=·1375×120— 9·4430= 5·8570	
58°50′N 6°26′W.	△Q=·0393× 27— ·5336= 0·5275	−0·01*
58°40′N 6°10′W.	△Q=·0426× 27— ·5757= 0·5745	
		−2·69

*This represents non-oceanic water (see Figure 67) the amount of which is therefore deducted from the aggregate of oceanic water transport.

FAROE BANK—BUTT OF LEWIS

F.R.S. *SCOTIA*

19-20 September, 1951

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
SSW. 4-5.			60°54′N 8°16′W 174 m.			20.9.51 1300-1400
0	10·87	35·24	27·00	107		
10	·84	·26	·02	105	·0106	
20	·78	·27	·04	104	·0210	
30	·77	·29	·06	102	·0313	
50	·45	·27	·10	99	·0514	
75	9·78	·27	·22	88	·0748	
100	·46	·27	·27	84	·0963	
125	·44	·27	·27	84	·1173	
165	·48	·29	·28	84	·1509	
[200]				81	·1798	
[300]				73	·2568	
[400]				64	·3253	
[500]				40	·3773	
[550]				26	·3938	124·1795

SSW. 4. 60°45′N 8°08′W 20.9.51
842 m. 1115-1150

m	t°C	S‰	$_t\sigma$	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·96	35·35	27·07	100		
10	·95	·35	·07	101	·0100	
20	·48	·34	·15	93	·0197	
30	·41	·34	·16	93	·0290	
50	9·75	·36	·29	81	·0464	
75	·73	·35	·29	81	·0666	
100	·28	·36	·37	74	·0860	
150	·36	·35	·35	77	·1238	
200	8·99	·35	·41	72	·1610	
300	·69	·35	·46	69	·2315	
400	7·83	·26	·52	65	·2985	
[500]				39	·3505	
[550]				25	·3665	113·3810
600	1·45	·00	28·03	12		

S. 4-5. 60°35′N 8°00′W 20.9.51
932 m. 0800-1020

m	t°C	S‰	$_t\sigma$	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·58	35·33	27·12	96		
10	·58	·35	·14	94	·0095	
20	·58	·35	·14	94	·0189	
30	·58	·35	·14	94	·0283	
50	·58	·34	·13	96	·0473	
75	·59	·34	·13	97	·0714	
100	·33	·34	·18	92	·0950	
150	9·46	·35	·33	79	·1378	
200	8·69	·34	·45	68	·1746	
300	7·64	·33	·61	55	·2361	
400	6·68	·26	·69	48	·2876	
[500]				27	·3251	
[550]				16	·3359	102·2553
600	2·82	·25	28·12	5		

S. 4. 60°23½′N 7°49½′W 20.9.51
887 m. 0550-0650

m	t°C	S‰	$_t\sigma$	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·16	35·35	27·04	103		
10	·16	·38	·06	102	·0102	
20	·14	·36	·05	103	·0204	
30	·07	·37	·07	101	·0306	
50	10·46	·37	·18	91	·0498	
75	·07	·41	·28	82	·0714	
100	9·34	·38	·37	74	·0909	
150	·23	·37	·38	74	·1279	
200	·04	·34	·39	74	·1649	
300	8·69	·36	·47	68	·2359	
400	7·57	·32	·61	56	·2979	
500	6·56	·25	·69	49	·3504	
[550]				43	·3734	114·7868
600	4·94	·15	·82	37		

S. 2. 60°12′N 7°40′W 20.9.51
695 m. 0330-0455

m	t°C	S‰	$_t\sigma$	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·16	35·35	27·04	103		
10	·17	·38	·06	102	·0102	
20	·16	·39	·07	101	·0204	
30	·15	·41	·08	100	·0304	
50	10·80	·37	·12	97	·0501	
75	·66	·38	·15	95	·0741	
100	·28	·42	·25	86	·0967	
150	9·59	·41	·36	76	·1372	
200	·36	·42	·40	73	·1744	
300	·09	·41	·44	72	·2469	
400	8·90	·40	·46	71	·3184	
500	·44	·35	·50	69	·3884	
[550]				56	·4196	123·4580
675	3·74	·15	·96	23		

S. 2. 59°56′N 7°27′W 20.9.51
668 m. 0025-0140

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·48	35·35	26·98	109		
10	·43	·34	·98	109	·0109	
20	·24	·35	27·02	106	·0217	
30	·23	·36	·03	105	·0323	
50	10·93	·37	·09	100	·0528	
75	·30	·37	·21	89	·0764	
100	9·70	·37	·31	80	·0975	
150	·43	·36	·34	78	·1370	
200	·09	·36	·40	73	·1748	
300	8·92	·35	·42	73	·2478	
400	·75	·34	·44	73	·3208	
500	·63	·35	·46	73	·3938	
[550]				73	·4303	124·6773
650	·40	·34	·49	73		

Var. 2. 59°44′N 7°15′W 19.9.51
1042 m. 2130-2305

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·89	35·34	26·89	117		
10	·84	·30	·87	120	·0118	
20	·67	·32	·92	115	·0236	
30	·66	·35	·94	113	·0350	
50	·47	·35	·98	110	·0573	
75	·07	·35	27·05	104	·0841	
100	10·45	·35	·16	94	·1089	
150	9·37	·37	·36	76	·1514	
200	·27	·37	·38	75	·1892	
300	·02	·35	·41	74	·2637	
400	8·88	·35	·43	74	·3377	
[500]				74	·4117	
[550]				75	·4489	132·3545
600	·67	·35	·46	75		

N. 2. 59°31′N 7°05′W 19.9.51
1033 m. 1815-1950

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	12·34	35·35	26·81	125		
10	·34	·35	·81	125	·0125	
20	·26	·34	·82	125	·0250	
30	·25	·34	·82	125	·0375	
50	·18	·35	·84	123	·0623	
75	·15	·36	·85	123	·0931	
100	9·79	·50	27·39	72	·1175	
150	·70	·35	·29	83	·1563	
200	·32	·35	·36	77	·1963	
300	·17	·34	·38	77	·2733	
400	8·97	·34	·41	76	·3498	
[500]				76	·4258	
[550]				76	·4638	137·4505
600	·69	·34	·45	76		

N. 2. 59°17′N 6°53′W 19.9.51
622 m. 1555-1630

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	12·17	35·37	26·86	120		
10	·17	·44	·91	116	·0118	
20	·17	·39	·87	120	·0236	
30	·17	·43	·90	117	·0354	
50	·17	·44	·91	117	·0588	
75	10·53	·39	27·18	92	·0849	
100	·72	·37	·13	97	·1085	
150	9·74	·38	·31	81	·1530	
200	·64	·38	·33	80	·1932	
300	·44	·37	·35	80	·2732	
[385]				80	·3412	70·3112
400	·38	·38	·37	80	·3532	
500	·32	·36	·36	83	·4347	
[550]				83	·4762	137·6867
600	·24	·35	·37	84		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
NNW. 3.			59°00′N 6°40′W			19.9.51
			146 m.			1255-1350
0	12·32	34·97	26·52	153		
10	·30	35·18	·68	138	·0146	
[15]				134	·0214	0·1630
20	·29	·28	·76	130	·0280	
30	·28	·28	·76	131	·0410	
50	10·13	·17	27·08	101	·0642	
75	·03	·22	·13	96	·0888	
100	·02	·17	·10	100	·1133	
[130]				86	·1412	9·9392
140	9·43	·31	·30	82	·1497	
[200]				80	·1983	
[300]				80	·2783	
[385]				80	·3463	72·1972
N. 3.			58°50′N 6°26′W			19.9.51
			117 m.			1115-1130
0	12·46	34·89	26·43	161		
10	·46	·91	·44	160	·0160	
[15]				159·5	·0240	·1800
20	·43	·93	·46	159	·0320	
30	·39	35·01	·54	151	·0475	
50	11·80	·05	·68	139	·0765	
[56·5]				137·5	·0855	2·4840
75	·93	·17	·75	133	·1105	
110	10·52	·18	27·02	108	·1527	
[115]				108	·1581	9·6780
[130]				100	·1737	12·1665
WNW. 4.			58°40′N 6°10′W			19.9.51
			113 m.			0810-1910
0	12·65	34·83	26·35	169		
10	·68	·82	·33	171	·0170	
20	·69	·81	·32	172	·0342	
30	·70	·82	·33	171	·0514	
50	·68	·85	·36	169	·0854	
[56·5]				166·5	·0963	2·7275
75	·58	·96	·46	160	·1265	
105	11·94	35·08	·68	140	·1715	
[115]				104	·1837	11·0318

Volume Transport

			Km³/hr.
65°54′N	8°16′W.	△Q=·3935×550−124·0633= 92·3617	+ 1·18
60°45′N	8°08′W.	△Q=·3665×550−113·3810= 88·1940	+ 1·62
60°35′N	8°00′W.	△Q=·3359×550−102·2553= 82·4897	− 2·30
60°23½′N	7°49½′W.	△Q=·3734×550−114·7868= 90·5832	− 4·76
60°12′N	7°40′W.	△Q=·4196×550−123·4580=107·3220	− 1·33
59°56′N	7°27′W.	△Q=·4303×550−124·6773=111·9877	− 0·73
59°44′N	7°15′W.	△Q=·4489×550−132·3545=114·5405	− 0·89
59°31′N	7°05′W.	△Q=·4638×550−137·4505=117·6395	− 1·94
59°17′N	6°53′W.	△Q=·4762×550−137·6867=124·2233	
”		△Q=·3412×385− 70·3112= 61·0508	− 0·02
59°00′N	6°40′W.	△Q=·3463×385− 72·1972= 61·1283	
”		△Q=·1412×130− 9·9392= 8·4168	− 0·58
58°50′N	6°26′W.	△Q=·1737×130− 12·1665= 10·4145	
59°00′N	6°40′W.	△Q=·0214× 15− 0·1630= 0·1580	− 0·01*
58°50′N	6°26′W.	△Q=·0240× 15− 0·1800= 0·1800	
58°50′N	6°26′W.	△Q=·1581×115− 9·6780= 8·5035	− 0·46
58°40′N	6°10′W.	△Q=·1837×115− 11·0318= 10·0937	
58°50′N	6°26′W.	△Q=·0855×56·5− 2·4840= 2·3468	− 0·19*
58°40′N	6°10′W.	△Q=·0963×56·5− 2·7275= 3·0134	
			−10·01

*These measures of non-oceanic water transport (see Figure 68) are *deducted* from the aggregate oceanic water transport of the whole computation.

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m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
SE. 3.			62°00′N 6°12′W			28.10.51
			117 m.			1320-1430
0	9·40	35·23	27·25	83		
10	·41	·17	·20	88	·0086	
20	·41	·17	·20	88	·0174	
30	·41	·18	·21	88	·0262	
50	·41	·17	·20	89	·0439	
75	·42	·17	·20	90	·0663	
100	·42	·18	·21	89	·0887	
115	·40	·17	·20	90	·1021	
[150]				86	·1329	
[180]				83	·1583	14·3185
SSE. 4.			61°54′N 5°45′W			28.10.51
			238 m.			1625-1745
0	9·58	35·25	27·24	84		
10	·58	·24	·23	85	·0084	
20	·58	·24	·23	86	·0170	
30	·60	·22	·21	88	·0257	
50	·58	·25	·24	85	·0430	
75	·45	·26	·27	83	·0640	
100	·39	·26	·28	83	·0848	
150	·07	·29	·35	77	·1248	
[180]				81	·1485	13·6525
200	·41	·28	·29	84	·1650	
[210]				80	·1732	18·4930
230	8·52	·28	·43	71		
SE. 3-4.			61°49′N 5°21′W			28.10.51
			178 m.			1830-
0	9·16	35·26	27·32	77		
10	·14	·32	·36	73	·0075	
20	·16	·31	·35	74	·0149	
30	·16	·28	·33	76	·0224	
50	·16	·32	·36	74	·0374	
75	·07	·30	·36	74	·0559	
100	8·91	·32	·40	71	·0740	
150	·48	·32	·47	65	·1080	
170	·43	·34	·49	64	·1209	
[210]				65	·1467	15·9151
SSE. 4.			61°42′N 4°51′W			28.10.51
			242 m.			2055-2155
0	9·41	35·26	27·27	81		
10	·42	·26	·27	82	·0082	
20	·41	·26	·27	82	·0164	
30	·42	·25	·26	83	·0246	
50	·40	·24	·26	83	·0412	
75	·40	·26	·27	83	·0620	
100	·18	·26	·31	80	·0824	
150	8·63	·35	·47	65	·1186	
200	·33	·30	·47	66	·1514	
[210]				65	·1580	17·4440
230	·27	·35	·52	62	·1707	
[300]				54	·2113	
[360]				38	·2389	47·6070

SSE. 4-5. 61°35′N 4°15′W 28.10.51
650 m. 2350-2400

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	9·72	35·26	27·22	86		
10	·71	·26	·22	86	·0086	
20	·69	·25	·22	86	·0172	
30	·70	·24	·21	88	·0259	
50	·66	·25	·22	87	·0434	
75	·66	·25	·22	88	·0653	
100	·17	·32	·36	75	·0857	
150	8·37	·35	·51	62	·1199	
200	7·93	·32	·56	58	·1499	
300	6·07	·13	·67	48	·2029	
[360]				31	·2266	46·7368
[390]				23	·2347	53·6563
400	2·56	·00	·95	20		

SSE. 3. 61°28′N 3°42′W 29.10.51
1215 m. 0320-0545

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	9·20	35·17	27·24	84		
10	·18	·15	·23	85	·0084	
20	·17	·19	·26	83	·0168	
30	·17	·19	·26	83	·0251	
50	·14	·19	·26	83	·0417	
75	·20	·20	·26	84	·0626	
100	·05	·20	·29	82	·0834	
150	7·91	·27	·52	60	·1189	
200	·45	·27	·60	54	·1474	
300	4·92	·14	·83	32	·1904	
[390]				16	·2120	50·8873
400	1·85	34·99	28·00	14	·2135	
[465]				9	·2213	67·1458
[500]	0·22	·93	·06	7		
600	−0·33	·93	·09	3		

SSE. 3. 61°21′N 3°10′W 29.10.51
1317 m. 0700-0900

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	9·73	35·25	27·21	87		
10	·73	·25	·21	87	·0087	
20	·73	·26	·22	86	·0173	
30	·71	·27	·23	86	·0259	
50	·71	·28	·23	86	·0431	
75	·54	·25	·32	78	·0636	
100	·43	·39	·37	74	·0826	
150	·29	·39	·39	73	·1194	
200	·14	·39	·42	71	·1554	
300	7·98	·24	·49	66	·2239	
400	6·32	·20	·69	48	·2809	
[465]				32	·3069	79·4693
[500]	3·00	·02	·92	24	·3167	
[515]				22	·3201	95·1583
600	0·82	34·96	28·05	9		

SE. 2. 61°14′N 2°40′W 29.10.51
1244 m. 1105-1330

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	9·73	35·23	27·19	89		
10	·74	·24	·20	88	·0088	
20	·73	·22	·19	89	·0176	
30	·73	·28	·23	86	·0264	
50	·69	·28	·24	85	·0435	
75	·67	·28	·24	86	·0649	
100	·63	·28	·25	86	·0864	
150	·45	·30	·29	83	·1286	
200	·03	·30	·36	77	·1686	
300	7·02	·22	·62	53	·2336	
400	3·45	·18	28·01	15	·2676	
[500]	1·07	·00	·06	8	·2791	
[515]				8	·2803	93·8467
[550]				7·5	·2830	103·7045
600	0·07	34·94	·08	5		

S. 2-3. 61°08′N 2°10′W 29.10.51
677 m. 1610-1730

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·62	35·43	27·19	89		
10	·62	·39	·16	92	·0090	
20	·63	·39	·16	92	·0182	
30	·63	·38	·15	94	·0275	
50	·61	·39	·16	93	·0462	
75	·64	·39	·16	94	·0696	
100	·63	·38	·15	95	·0932	
150	·24	·41	·24	88	·1390	
200	9·49	·38	·35	78	·1805	
300	·38	·39	·38	77	·2580	
[385]				64	·3179	64·8223
400	8·12	·36	·56	61	·3273	
[500]	4·73	·17	·86	31	·3733	
[550]	3·05	·05	·94	22	·3865	123·6863

S/E. 2-3. 61°01′N 1°36′W 29.10.51
167 m. 2000-2130

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·87	35·30	27·05	102		
10	·87	·29	·04	103	·0102	
20	·87	·29	·04	104	·0206	
30	·88	·30	·05	103	·0310	
50	·86	·30	·05	103	·0516	
75	·79	·32	·08	101	·0771	
100	·66	·32	·10	100	·1022	
[140]				98	·1418	10·0190
160	·43	·32	·14	97	·1613	
[200]				90	·1987	
[300]				80	·2837	
[385]				75	·3496	71·2852

SSW. 2. 60°56′N 1°00′W 30.10.51
115 m. 0035-0120

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·87	35·28	27·03	104		
10	·87	·26	·02	105	·0104	
20	·87	·26	·02	106	·0210	
30	·90	·26	·01	107	·0316	
50	·83	·28	·04	104	·0527	
75	·79	·29	·06	105	·0786	
100	·79	·35	·10	100	·1040	
110	·80	·35	·10	100	·1140	
[140]				97	·1436	10·1927

VOLUME TRANSPORT

		Km.³/hr.
62°00′N 6°12′W.	ΔQ = ·1583 × 180 − 14·3185 = 14·1755	+ 0·31
61°54′N 5°45′W.	ΔQ = ·1485 × 180 − 13·6525 = 13·0775	
„	ΔQ = ·1732 × 210 − 18·4930 = 17·8790	+ 0·84
61°49′N 5°21′W.	ΔQ = ·1467 × 210 − 15·9151 = 14·8919	
61°42′N 4°51′W.	ΔQ = ·1580 × 210 − 17·4440 = 15·7360	− 0·24
„	ΔQ = ·2389 × 360 − 47·6070 = 38·3970	+ 1·00
61°35′N 4°15′W.	ΔQ = ·2266 × 360 − 46·7368 = 34·8392	
„	ΔQ = ·2347 × 390 − 53·6563 = 37·8767	+ 1·71
61°28′N 3°42′W.	ΔQ = ·2120 × 390 − 50·8873 = 31·7927	
„	ΔQ = ·2213 × 465 − 67·1458 = 35·7587	− 7·73
61°21′N 3°10′W.	ΔQ = ·3069 × 465 − 79·4693 = 63·2392	
„	ΔQ = ·3201 × 515 − 95·1583 = 69·6932	+ 5·40
61°14′N 2°40′W.	ΔQ = ·2803 × 515 − 93·8467 = 50·5078	
„	ΔQ = ·2830 × 550 − 103·7045 = 51·9455	−10·42
61°08′N 2°10′W.	ΔQ = ·3865 × 550 − 123·6863 = 88·8887	
„	ΔQ = ·3179 × 385 − 64·8223 = 57·5692	− 1·62
61°01′N 1°36′W.	ΔQ = ·3496 × 385 − 71·2852 = 63·3108	
„	ΔQ = ·1418 × 140 − 10·0190 = 9·8330	− 0·02
60°56′N 1°00′W.	ΔQ = ·1436 × 140 − 10·1927 = 9·9113	
		−10·77

NOLSØ, FAROE—FLUGGA, SHETLAND

Danish Research Vessel, *DANA*
10-13 December, 1951

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D\,dz$
W. 3.			62°00′N 6°12′W.			10.12.51
			121 m.			1800-1814
0	7·82	35·23	27·51	59		
20	·82	·22	·51	59	·0118	
50	·80	·22	·51	60	·0296	
75	·80	·22	·51	60	·0446	
117	·81	·22	·51	61	·0700	
[150]				61	·0901	
[165]				62	·0993	8·1352
SW. 5.			61°49′N 5°21′W			12.12.51
			210 m.			1500-1530
0	8·12	35·26	27·49	62		
20	·10	·26	·48	62	·0124	
50	·07	·26	·49	61	·0308	
75	·05	·26	·49	62	·0462	
100	·06	·22	·46	65	·0621	
150	·03	·23	·47	65	·0946	
[165]				65	·1044	8·4983
195	·03	·23	·47	66	·1240	
[200]				66	·1273	
[255]				66	·1636	20·5523
WSW. 5.			61°42½′N 4°51′W			12.12.51
			295 m.			1715-1740
0	7·40	35·19	27·54	56		
20	·40	·19	·54	56	·0112	
50	·40	·19	·54	57	·0282	
75	·40	·19	·54	57	·0424	
100	·38	·22	·57	55	·0564	
150	·37	·20	·55	57	·0844	
200	·12	·18	·58	55	·1124	
[255]				52	·1418	18·2510
280	6·69	·18	·64	51	·1547	
[300]				48	·1646	
[410]				15	·1992	45·1592
WSW. 5.			61°35′N 4°15′W			12.12.51
			1050 m.			2003-2045
0	8·60	35·33	27·46	63		
10	·60	·33	·46	64	·0064	
20	·61	·33	·46	64	·0128	
50	·60	·33	·46	64	·0320	
75	·59	·32	·45	66	·0482	
100	·58	·31	·45	66	·0647	
150	·57	·31	·45	67	·0979	
200	7·99	·30	·53	60	·1297	
300	·26	·26	·62	53	·1862	
400	2·90	·05	·96	19	·2222	
[410]				18	·2240	51·4147
500	0·40	34·95	28·06	7	·2352	
[530]				6	·2372	79·1647
600	–0·18	·93	·08	4		
SW. 6.			61°28′N 3°42′W			12.12.51
			1300 m.			2251-2341
0	9·07	35·36	27·41	68		
20	·07	·36	·41	68	·0136	
50	8·96	·35	·42	68	·0340	
75	·94	·36	·43	68	·0510	
100	·90	·34	·42	69	·0681	
150	·81	·34	·43	69	·1026	
200	·81	·34	·43	70	·1374	
300	·76	·32	·43	72	·2084	
400	·56	·32	·46	71	·2799	
500	6·42	·22	·69	49	·3399	
[530]				38	·3529	96·7558
600	1·88	·01	28·02	13	·3707	
[610]				12·5	·3720	125·7953
800	–0·22	34·94	·09	3		

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D\,dz$
WSW. 6.			61°21′N 3°10′W			13.12.51
			1150 m.			0145-0233
0	9·71	35·38	27·31	78		
20	·72	·38	·31	78	·0156	
50	·72	·38	·31	79	·0392	
75	·70	·38	·32	78	·0588	
100	·66	·38	·32	79	·0784	
150	·47	·38	·35	77	·1174	
200	·42	·36	·35	78	·1562	
300	8·92	·35	·42	73	·2317	
400	·61	·34	·46	71	·3037	
500	6·36	·19	·68	50	·3642	
600	1·78	34·98	28·00	15	·3967	
[610]				14·5	·3982	137·2325
[620]				14	·3996	141·2215
800	–0·47	·92	·08	4		
WSW. 6.			61°14′N 2°40′W			13.12.51
			ca. 700 m.			0410-0445
0	9·73	35·43	27·35	74		
20	·72	·43	·35	74	·0148	
50	·70	·43	·35	75	·0372	
75	·69	·42	·35	75	·0560	
100	·65	·41	·35	76	·0749	
150	·63	·40	·34	78	·1134	
200	·62	·40	·34	79	·1526	
300	·50	·40	·36	79	·2316	
400	·32	·40	·39	78	·3101	
500	8·85	·36	·44	75	·3866	
[555]				65	·4251	118·5386
600	6·92	·23	·64	56	·4523	
[620]				40	·4619	147·4221
660	0·58	34·96	28·06	8		
WSW. 5.			61°08′N 2°10′W			13.12.51
			452 m.			0712-
0	9·70	35·44	27·36	73		
10	·70	·44	·36	73	·0073	
20	·71	·44	·36	73	·0146	
50	·70	·44	·36	74	·0366	
75	·69	·44	·36	75	·0552	
100	·68	·43	·36	75	·0740	
150	·68	·44	·37	75	·1115	
200	·60	·44	·38	75	·1490	
300	·54	·43	·38	77	·2250	33·5265
420	·34	·42	·41	77	·3174	
[555]				73	·4186	115·7505
WSW. 5.			61°01′N 1°36′W			13.12.51
			150 m.			0940-
0	9·80	35·36	27·28	80		
20	·80	·36	·28	81	·0161	
50	·80	·37	·29	81	·0404	
75	·79	·36	·29	81	·0606	
100	·79	·38	·30	81	·0808	
[130]				81	·1051	6·8270
147	·74	·38	·31	81	·1189	
[200]				80	·1616	
[300]				76	·2396	36·2242
WSW. 5.			60°53′N 1°06′W			13.12.51
			105 m.			1135-1150
0	9·35	35·25	27·27	81		
20	·35	·25	·27	82	·0163	
50	·34	·20	·24	85	·0413	
75	·32	·23	·26	84	·0624	
100	·30	·20	·24	86	·0836	
[130]				84	·1091	7·0388

VOLUME TRANSPORT

		Km³/hr.
62°00′N 6°12′W.	△Q=·0993×165— 8·1352= 8·2493	− 0·13
61°49′N 5°21′W.	△Q=·1044×165— 8·4983= 8·7277	
”	△Q=·1636×255— 20·5523= 21·1657	+ 0·91
61°42½′N 4°51′W.	△Q=·1418×255— 18·2510= 17·9080	
”	△Q=·1992×410— 45·1592= 36·5128	− 1·10
61°35′N 4°15′W.	△Q=·2240×410— 51·4147= 40·4253	
”	△Q=·2372×530— 79·1647= 46·5513	−12·29
61°28′N 3°42′W.	△Q=·3529×530— 96·7558= 90·2812	
”	△Q=·3720×610—125·7953=101·1247	− 1·28
61°21′N 3°10′W.	△Q=·3982×610—137·2325=105·6695	
”	△Q=·3996×620—141·2215=106·5305	− 9·13
61°14′N 2°40′W.	△Q=·4619×620—147·4221=138·9559	
”	△Q=·4251×555—118·5386=117·3919	+ 0·23
61°08′N 2°10′W.	△Q=·4186×555—115·7505=116·5725	
”	△Q=·2250×300— 33·5265= 33·9735	− 0·47
61°01′N 1°36′W.	△Q=·2396×300— 36·2242= 35·6558	
”	△Q=·1051×130— 6·8270= 6·8360	− 0·09
60°53′N 1°06′W.	△Q=·1091×130— 7·0388= 7·1442	
		−23·35

1952

NOLSØ, FAROE—FLUGGA, SHETLAND

F.R.S. *SCOTIA*

18-20 February, 1952

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
NW. 4.			62°00′N 6°12′W			18.2.52
			119 m.			1855-2005
0	5·92	35·23	27·77	34		
10	·94	·23	·77	34	·0034	
20	·90	·22	·77	34	·0068	
30	·88	·25	·79	32	·0101	
50	·82	·24	·79	33	·0166	
75	·83	·23	·78	34	·0250	
115	·82	·24	·79	34	·0386	
[190]				40	·0664	6·1490
NW/W. 3-4.			61°54′N 5°45′W			18.2.52
			258 m.			2130-2225
0	6·13	35·26	27·77	34		
10	·12	·23	·67	44	·0039	
20	·15	·23	·74	37	·0079	
30	·14	·23	·74	37	·0116	
50	·14	·23	·74	38	·0191	
75	·14	·23	·74	38	·0286	
100	·15	·23	·74	38	·0381	
150	·14	·23	·74	39	·0573	
[190]				41	·0733	6·9100
200	·22	·23	·73	41	·0774	
[215]				41	·0836	8·8710
250	·20	·23	·73	42		
NW/W. 3-4.			61°49′N 5°21′W			19.2.52
			174 m.			0100-0155
0	6·14	35·24	27·74	37		
10	·14	·24	·74	37	·0037	
20	·17	·23	·74	37	·0074	
30	·14	·23	·74	37	·0111	
50	·13	·25	·76	36	·0184	
75	·15	·23	·74	38	·0276	
100	·15	·23	·74	38	·0371	
125	·13	·24	·74	39	·0467	
170	·13	·25	·76	38	·0640	
[200]				41	·0758	
[215]				41	·0820	8·6611
[230]				42	·0882	9·9376

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
NW/W. 4.			61°42′N 4°51W			19.2.52
			282 m.			0330-0440
0	6·53	35·25	27·70	41		
10	·52	·21	·67	44	·0042	
20	·52	·23	·68	43	·0086	
30	·52	·21	·67	44	·0130	
50	·52	·21	·67	44	·0218	
75	·53	·21	·67	45	·0329	
100	·52	·23	·68	44	·0440	
150	·46	·23	·70	43	·0658	
200	·32	·21	·70	44	·0876	
[230]				40	·1002	11·5830
275	4·76	·10	·80	34	·1168	
[335]				25	·1345	24·0045
WNW. 5.			61°35′N 4°15′W			19.2.52
			923 m.			0630-0750
0	7·03	35·26	27·65	45		
10	·03	·26	·65	46	·0046	
20	·03	·26	·65	46	·0092	
30	·03	·26	·65	46	·0138	
50	6·98	·26	·66	45	·0229	
75	·94	·26	·66	46	·0343	
100	·86	·26	·68	44	·0455	
150	·80	·23	·66	47	·0683	
200	·64	·17	·64	50	·0925	
300	4·77	·05	·77	38	·1365	
[335]				33	·1489	25·5960
[350]				31	·1537	27·8655
400	2·21	34·91	·90	24		
W. 5-6.			61°28′N 3°42′W			19.2.52
			1217 m.			0940-1050
0	7·04	35·31	27·68	43		
10	·03	·31	·68	43	·0043	
20	·03	·31	·68	43	·0086	
30	·04	·32	·68	43	·0129	
50	·04	·35	·71	40	·0212	
75	·04	·31	·68	44	·0317	
100	6·87	·30	·70	42	·0425	
150	7·05	·32	·69	44	·0640	
200	6·26	·32	·80	34	·0835	
300	4·50	·24	·94	21	·1110	
[350]				22	·1218	24·0182
400	2·09	34·91	·92	22	·1328	
[500]	0·05	·92	28·06	7	·1473	
600	−0·27	·96	·11	1	·1513	
[685]				0·4	·1519	72·2042
800	−·56	·96	·12	0		
W.5.			61°21′N 3°10′W			19.2.52
			1317 m.			1225-1525
0	7·87	35·34	27·59	51		
10	·93	·34	·58	52	·0052	
20	·93	·34	·58	52	·0104	
30	·93	·34	·58	52	·0156	
50	·91	·33	·58	53	·0261	
75	·85	·32	·58	53	·0393	
100	·84	·33	·58	54	·0527	
150	·85	·33	·58	55	·0799	
200	·15	·23	·61	52	·1067	
300	6·89	·23	·65	50	·1577	
400	4·88	·23	·89	28	·1967	
500	5·06	·23	·87	31	·2262	
600	·17	·23	·86	33	·2582	
[685]				20	·2807	109·8067
[705]				17	·2844	115·4577
800	−0·15	34·95	28·10	2	·2934	

WSW. 6. 61°14′N 2°40′W 19.2.52
869 m. 1640-1815

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_o^{z_1} \Delta D dz$
0	7·90	35·35	27·58	52		
10	·88	·35	·58	52	·0052	
20	·83	·35	·59	52	·0104	
30	·75	·33	·59	52	·0156	
50	·59	·33	·61	50	·0258	
75	·55	·34	·62	50	·0383	
100	·54	·33	·61	51	·0509	
150	·55	·33	·61	52	·0767	
200	·42	·34	·66	48	·1017	
300	·08	·26	·64	51	·1512	
400	5·12	·02	·70	46	·1997	
[500]	2·56	34·96	·92	23	·2342	
[505]				22	·2353	63·2730
600	0·37	·95	28·07	6	·2486	
[700]	–0·78	·94	·12	–1		
[705]				–1	·2512	112·4977

W. 6. 61°08′N 2°10′W 19.2.52
439 m. 1950-2050

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_o^{z_1} \Delta D dz$
0	8·28	35·35	27·52	58		
10	·29	·38	·55	55	·0056	
20	·31	·35	·52	58	·0112	
30	·28	·35	·52	58	·0170	
50	·29	·35	·52	59	·0287	
75	·30	·35	·52	59	·0435	
100	·33	·35	·51	61	·0585	
150	·32	·35	·52	60	·0887	
200	·32	·35	·52	61	·1189	
[290]				62	·1743	24·9515
300	·20	·35	·54	62	·1805	
400	7·59	·33	·61	56	·2395	
[505]				48	·2941	75·7395

W. 6. 61°01′N 1°36′W 19.2.52
141 m. 2220-2300

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_o^{z_1} \Delta D dz$
0	8·05	35·38	27·58	52		
10	·05	·38	·58	52	·0052	
20	·09	·38	·58	52	·0104	
30	·09	·39	·58	52	·0156	
50	·09	·39	·58	53	·0261	
75	·10	·40	·59	53	·0393	
100	·03	·40	·60	52	·0524	
[120]				53	·0629	3·7677
135	·10	·40	·59	54	·0709	
[150]				55	·0791	
[200]				56	·1069	
[290]				58	·1582	22·4757

W. 6-7. 60°56′N 1°00′W 20.2.52
101 m. 0030-0115

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_o^{z_1} \Delta D dz$
0	7·70	35·40	27·64	46		
10	·71	·40	·65	46	·0046	
20	·71	·40	·65	46	·0092	
30	·69	·39	·64	47	·0138	
50	·69	·40	·65	46	·0231	
75	·64	·41	·66	46	·0346	
95	·72	·41	·66	46	·0438	
[100]				46	·0461	
[120]				50	·0557	3·3240

VOLUME TRANSPORT

		Km.³/hr.
62°00′N 6°12′W.	$\Delta Q = \cdot 0664 \times 190 - 6\cdot 1490 = 6\cdot 4670$	– 0·15
61°54′N 5°45′W.	$\Delta Q = \cdot 0733 \times 190 - 6\cdot 9100 = 7\cdot 0170$	
”	$\Delta Q = \cdot 0836 \times 215 - 8\cdot 8710 = 9\cdot 1030$	+ 0·04
61°49′N 5°21′W.	$\Delta Q = \cdot 0820 \times 215 - 8\cdot 6611 = 8\cdot 9689$	
”	$\Delta Q = \cdot 0882 \times 230 - 9\cdot 9376 = 10\cdot 3484$	– 0·31
61°42′N 4°51′W.	$\Delta Q = \cdot 1002 \times 230 - 11\cdot 5830 = 11\cdot 4630$	
”	$\Delta Q = \cdot 1345 \times 335 - 24\cdot 0045 = 21\cdot 0530$	– 0·91
61°35′N 4°15′W.	$\Delta Q = \cdot 1489 \times 335 - 25\cdot 5960 = 24\cdot 2855$	
”	$\Delta Q = \cdot 1537 \times 350 - 27\cdot 8655 = 25\cdot 9295$	+ 2·05
61°28′N 3°42′W.	$\Delta Q = \cdot 1218 \times 350 - 24\cdot 0182 = 18\cdot 6118$	
”	$\Delta Q = \cdot 1519 \times 685 - 72\cdot 2042 = 31\cdot 8473$	–14·24
61°21′N 3°10′W.	$\Delta Q = \cdot 2807 \times 685 - 109\cdot 8067 = 82\cdot 4728$	
”	$\Delta Q = \cdot 2844 \times 705 - 115\cdot 4577 = 85\cdot 0443$	+ 5·75
61°14′N 2°40′W.	$\Delta Q = \cdot 2512 \times 705 - 112\cdot 4977 = 64\cdot 5983$	
”	$\Delta Q = \cdot 2353 \times 505 - 63\cdot 2730 = 55\cdot 5535$	– 4·86
61°08′N 2°10′W.	$\Delta Q = \cdot 2941 \times 505 - 75\cdot 7395 = 72\cdot 7810$	
”	$\Delta Q = \cdot 1743 \times 290 - 24\cdot 9515 = 25\cdot 5955$	+ 0·62
61°01′N 1°36′W.	$\Delta Q = \cdot 1582 \times 290 - 22\cdot 4757 = 23\cdot 4023$	
”	$\Delta Q = \cdot 0629 \times 120 - 3\cdot 7677 = 3\cdot 7803$	+ 0·12
60°56′N 1°00′W.	$\Delta Q = \cdot 0557 \times 120 - 3\cdot 3240 = 3\cdot 3600$	
		–11·89

LATITUDE 62°15′N, LONGITUDE 9°30′W
—FAROE BANK—BUTT OF LEWIS
F.R.S. *SCOTIA*
10-14 March, 1952

W. 4. 62°15′N 9°30′W 14.3.52
522 m. 1720-1820

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_o^{z_1} \Delta D dz$
0	7·39	35·23	27·58	52		
10	·38	·24	·58	52	·0052	
20	·33	·26	·61	50	·0103	
30	·33	·25	·60	51	·0153	
50	·33	·25	·60	51	·0255	
75	·34	·26	·61	51	·0383	
100	·34	·24	·59	53	·0513	
150	·22	·25	·61	52	·0775	
200	·06	·21	·61	53	·1037	
300	6·69	·21	·66	49	·1547	
400	4·51	·05	·79	37	·1977	
500	1·86	·01	28·02	13	·2227	
[525]				10	·2256	67·4708

WSW. 4. 62°02′N 9°18′W 14.3.52
531 m. 1430-1650

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_o^{z_1} \Delta D dz$
0	8·12	35·24	27·46	63		
10	·13	·23	·45	65	·0064	
20	·12	·25	·47	63	·0128	
30	·11	·25	·47	63	·0191	
50	·03	·23	·47	63	·0317	
75	·04	·23	·47	64	·0476	
100	7·94	·30	·54	58	·0628	
150	·95	·29	·53	60	·0923	
200	·83	·28	·54	59	·1221	
300	·75	·21	·52	63	·1831	
400	·67	·14	·47	69	·2491	
500	6·54	·07	·56	62	·3146	
[520]				60	·3268	83·8732
[525]				49	·3295	85·5140

SSW. 5. 61°48′N 9°06′W 14.3.52
695 m. 1155-1300

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	7·94	35·21	27·46	63		
10	·93	·23	·48	62	·0062	
20	·93	·21	·47	63	·0124	
30	·93	·20	·46	64	·0188	
50	·91	·21	·47	63	·0315	
75	·84	·22	·50	61	·0470	
100	·76	·20	·50	61	·0622	
150	·95	·21	·48	64	·0934	
200	·70	·22	·52	61	·1246	
300	·56	·22	·54	61	·1856	
400	6·82	·16	·60	57	·2446	
[490]				22	·2802	73·1052
500	3·37	·00	·88	18	·2822	
[520]				19	·2859	81·5982
600	1·43	34·86	·93	21		

S/W. 4. 61°35′N 8°53′W 14.3.52
778 m. 0920-1025

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	7·53	34·90	27·29	80		
10	·53	35·22	·54	56	·0068	
20	·53	·22	·54	56	·0124	
30	·53	·16	·50	60	·0182	
50	·46	·21	·55	56	·0298	
75	·44	·18	·53	58	·0440	
100	·44	·19	·53	59	·0586	
150	·25	·21	·58	55	·0871	
200	·16	·20	·59	54	·1143	
300	6·90	·21	·63	52	·1673	
400	·19	·17	·69	48	·2173	
[425]				50	·2295	50·5405
[490]				54	·2633	66·5565
500	5·48	34·96	·62	55		

SSW. 5. 61°21½′N 8°41′W 14.3.52
269 m. 0718-0745

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	7·65	35·16	27·48	62		
10	·63	·17	·50	60	·0061	
20	·64	·21	·52	58	·0120	
30	·63	·21	·52	58	·0178	
50	·63	·17	·50	61	·0297	
75	·64	·17	·50	61	·0449	
100	·65	·19	·50	61	·0601	
150	·65	·17	·50	62	·0909	
[180]				62	·1095	9·7710
200	·55	·18	·51	62	·1219	
250	·35	·21	·56	58	·1519	
[300]				54	·1799	
[400]				51	·2324	
[425]				50	·2450	53·8075

S. 4. 61°08′N 8°29′W 14.3.52
95 m. 0445-0550

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	7·43	35·23	27·57	53		
10	·43	·31	·63	48	·0050	
20	·33	·22	·58	52	·0100	
30	·33	·22	·58	53	·0152	
50	·25	·22	·59	52	·0257	
75	·26	·23	·59	52	·0387	
90	·25	·22	·59	53	·0466	
[140]				62	·0754	5·1298
[180]				62	·1002	8·6418

Volume Transport

		Km.³/hr.
62°15′N 9°30′W.	$\Delta Q = {\cdot}2256 \times 525 - 67{\cdot}4708 = 50{\cdot}9692$	−10·19
62°02′N 9°18′W.	$\Delta Q = {\cdot}3295 \times 525 - 85{\cdot}5140 = 87{\cdot}4735$	
”	$\Delta Q = {\cdot}3268 \times 520 - 83{\cdot}8732 = 86{\cdot}0628$	+ 5·32
61°48′N 9°06′W.	$\Delta Q = {\cdot}2859 \times 520 - 81{\cdot}5982 = 67{\cdot}0698$	
”	$\Delta Q = {\cdot}2802 \times 490 - 73{\cdot}1052 = 64{\cdot}1928$	+ 0·49
61°35′N 8°53′W.	$\Delta Q = {\cdot}2633 \times 490 - 66{\cdot}5565 = 62{\cdot}4605$	
”	$\Delta Q = {\cdot}2295 \times 425 - 50{\cdot}5405 = 46{\cdot}9970$	− 0·93
61°21½′N 8°41′W.	$\Delta Q = {\cdot}2450 \times 425 - 53{\cdot}8075 = 50{\cdot}3175$	
”	$\Delta Q = {\cdot}1095 \times 180 - 9{\cdot}7710 = 9{\cdot}9390$	+ 0·15
61°08′N 8°29′W.	$\Delta Q = {\cdot}1002 \times 180 - 8{\cdot}6418 = 9{\cdot}3942$	
”	$\Delta Q = {\cdot}0754 \times 140 - 5{\cdot}1298 = 5{\cdot}4262$	+ 0·11
60°54′N 8°16′W.	$\Delta Q = {\cdot}0729 \times 140 - 5{\cdot}1770 = 5{\cdot}0290$	
		−5·05

S/W. 4. 60°54′N 8°16′W 13/14.3.52
179 m. 2320-0025

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	7·49	35·23	27·56	54		
10	·51	·24	·56	54	·0054	
20	·51	·22	·55	55	·0108	
30	·49	·24	·56	54	·0162	
50	·48	·25	·58	53	·0269	
75	·49	·26	·58	53	·0401	
100	·50	·36	·66	46	·0525	
[140]				56	·0729	5·1770
150	·54	·23	·54	58	·0785	
175	·55	·26	·57	56	·0927	
[200]				62	·1075	
[300]				56	·1665	
[400]				45	·2170	
[500]				26	·2525	
[550]				15	·2627	79·8165

S/W. 5. 60°45′N 8°08′W 13.3.52
750 m. 2140-2235

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	8·01	35·26	27·49	60		
10	·03	·25	·48	62	·0061	
20	·03	·25	·48	62	·0123	
30	·03	·30	·52	58	·0183	
50	·01	·31	·53	58	·0299	
75	7·98	·26	·50	61	·0448	
100	·96	·30	·53	59	·0598	
150	·93	·31	·54	58	·0890	
200	·93	·26	·50	63	·1192	
300	·58	·25	·56	59	·1802	
400	6·85	·25	·66	51	·2352	
500	3·80	·04	·86	30	·2757	
[550]				18	·2877	87·2938
600	0·06	34·93	28·07	6		

S/W. 5. 60°35′N 8°00′W 13.3.52
923 m. 1940-2020

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	8·42	35·32	27·48	62		
10	·43	·32	·48	62	·0062	
20	·43	·33	·48	62	·0124	
30	·43	·31	·47	63	·0186	
50	·43	·32	·48	62	·0311	
75	·44	·32	·47	64	·0469	
100	·36	·32	·49	62	·0627	
150	·34	·34	·50	62	·0937	
200	·23	·33	·51	62	·1247	
300	7·85	·25	·52	63	·1872	
400	·49	·25	·57	60	·2487	
500	·09	·21	·60	58	·3077	
[550]				45	·3335	93·7310
600	4·05	·08	·87	31		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
S/E. 5.			60°23½′N 7°49½′W			13.3.52
			932 m.			1710-1840
0	8·52	35·23	27·39	70		
10	·53	·26	·41	68	·0069	
20	·53	·26	·41	68	·0137	
30	·53	·26	·41	69	·0205	
50	·54	·23	·39	71	·0345	
75	·55	·26	·41	70	·0521	
100	·56	·26	·41	70	·0696	
150	·58	·26	·40	72	·1051	
200	·60	·25	·39	74	·1416	
300	·43	·26	·43	72	·2146	
400	·09	·25	·47	70	·2856	
500	6·86	·21	·63	55	·3481	
[550]				47	·3736	106·5447
600	4·72	·07	·79	39		
S/W. 5.			60°12′N 7°40′W			13.3.52
			659 m.			1440-1545
0	8·43	35·23	27·40	69		
10	·43	·25	·42	67	·0068	
20	·44	·26	·43	67	·0135	
30	·47	·27	·43	67	·0202	
50	·45	·26	·43	67	·0336	
75	·46	·27	·43	68	·0505	
100	·46	·26	·43	68	·0675	
150	·50	·28	·43	69	·1017	
200	·53	·27	·42	71	·1367	
300	·45	·22	·40	75	·2097	
400	7·72	·20	·50	67	·2807	
500	6·63	·05	·53	64	·3462	
[550]				45	·3734	104·7332
600	2·97	34·98	·90	26		
ESE. 5.			59°56′N 7°27′W			13.3.52
			567 m.			1120-1245
0	8·82	35·32	27·41	68		
10	·83	·27	·37	72	·0070	
20	·82	·29	·39	70	·0141	
30	·81	·34	·43	67	·0209	
50	·78	·34	·44	66	·0342	
75	·74	·28	·39	72	·0514	
100	·72	·27	·39	72	·0694	
150	·75	·28	·39	73	·1056	
200	·75	·28	·39	74	·1424	
300	·80	·27	·38	77	·2179	
400	·75	·28	·39	78	·2954	
500	·63	·28	·41	78	·3734	
[550]				78	·4124	110·8615
E. 2.			59°44′N 7°15′W			11.3.52
			1079 m.			0845-1000
0	9·03	35·34	27·40	69		
10	·03	·35	·40	69	·0069	
20	·05	·34	·40	70	·0139	
30	·03	·35	·40	70	·0209	
50	·06	·35	·40	70	·0349	
75	·10	·34	·39	72	·0527	
100	·09	·34	·39	72	·0707	
150	·00	·32	·39	73	·1069	
200	8·97	·31	·39	74	·1437	
300	·93	·28	·37	78	·2197	
400	·85	·25	·36	81	·2992	
500	·82	·25	·36	83	·3812	
[550]				84	·4230	112·4530
600	·87	·26	·36	85		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
E. 2.			59°31′N 7°05′W			11.3.52
			1033 m.			0550-0720
0	8·73	35·29	27·40	69		
10	·77	·30	·41	68	·0068	
20	·77	·32	·41	68	·0136	
30	·77	·30	·41	69	·0204	
50	·75	·30	·41	69	·0342	
75	·76	·28	·39	72	·0518	
100	·78	·28	·39	72	·0698	
150	·79	·32	·41	71	·1056	
200	·81	·32	·41	72	·1414	
300	·77	·31	·42	73	·2139	
400	·70	·33	·44	73	·2869	
500	·69	·28	·41	78	·3624	
[550]				77	·4012	108·3670
600	·58	·32	·45	76		
N. 2.			59°17′N 6°53′W			11.3.52
			586 m.			0300-0420
0	9·08	35·22	27·30	78		
10	·12	·24	·31	78	·0078	
20	·13	·25	·31	78	·0156	
30	·11	·26	·32	77	·0234	
50	·11	·26	·32	78	·0389	
75	·10	·27	·33	77	·0583	
100	·09	·30	·36	75	·0773	
150	·10	·30	·36	76	·1151	
200	·06	·28	·35	78	·1536	
300	·00	·28	·36	79	·2321	
[365]				78	·2831	51·4405
400	8·86	·29	·39	78	·3106	
[500]	·73	·29	·41	78	·3886	
550	·67	·30	·43	77	·4274	117·1915
			59°00′N 6°40′W			10/11.3.52
			146 m.			2340-0035
0	7·93	35·07	27·36	73		
10	·93	·10	·38	71	·0072	
20	·93	·12	·40	70	·0142	
30	·93	·12	·40	70	·0212	
50	·97	·10	·37	73	·0355	
75	8·04	·12	·38	72	·0536	
100	·12	·14	·38	73	·0717	
[130]				74	·0937	6·0480
140	·15	·13	·37	74	·1011	
[150]				74	·1085	
[200]				74	·1455	
[300]				75	·2200	
[365]				77	·2694	48·6015
NW. 2-3.			58°50′N 6°26′W			10.3.52
			111 m.			2135-2220
0	7·73	34·99	27·33	76		
10	·74	·99	·33	76	·0076	
20	·72	35·00	·34	75	·0152	
30	·68	·00	·35	74	·0226	
50	·64	·01	·36	74	·0374	
75	·59	·02	·38	72	·0556	
105	·69	·03	·36	75	·0776	
[115]				74	·0850	4·9145
[130]				74	·0961	6·2727

NW. 3. 58°40′N 6°10′W 10.3.52
119 m. 1830-1930

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	6·74	34·97	27·46	63		
10	·78	·88	·38	71	·0067	
20	7·06	·90	·36	73	·0139	
30	·34	·97	·38	72	·0211	
50	·43	·98	·38	72	·0355	
75	·44	·99	·38	72	·0535	
100	·44	35·01	·39	72	·0715	
115	·44	34·99	·38	73	·0824	4·7067

VOLUME TRANSPORT

			Km³/hr.
60°54′N	8°16′W.	ΔQ = ·2627 × 550 − 79·8165 = 64·6685	− 1·77
60°45′N	8°08′W.	ΔQ = ·2877 × 550 − 87·2938 = 70·9412	− 5·31
60°35′N	8°00′W.	ΔQ = ·3335 × 550 − 93·7310 = 89·6940	− 2·62
60°23½′N	7°49½′W.	ΔQ = ·3736 × 550 − 106·5447 = 98·9353	− 0·48
60°12′N	7°40′W.	ΔQ = ·3734 × 550 − 104·7332 = 100·6368	− 4·36
59°56′N	7°27′W.	ΔQ = ·4124 × 550 − 110·8615 = 115·9585	− 1·21
59°44′N	7°15′W.	ΔQ = ·4230 × 550 − 112·4530 = 120·1970	+ 2·26
59°31′N	7°05′W.	ΔQ = ·4012 × 550 − 108·3670 = 112·2930	− 1·60
59°17′N	6°53′W.	ΔQ = ·4274 × 550 − 117·1915 = 117·8785	
”		ΔQ = ·2831 × 365 − 51·4405 = 51·8910	+ 0·62
59°00′N	6°40′W.	ΔQ = ·2694 × 365 − 48·6015 = 49·7295	
”		ΔQ = ·0937 × 130 − 6·0480 = 6·1330	− 0·02
58°50′N	6°26′W.	ΔQ = ·0961 × 130 − 6·2727 = 6·2203	
”		ΔQ = ·0850 × 115 − 4·9145 = 4·8605	+ 0·03
58°40′N	6°10′W.	ΔQ = ·0824 × 115 − 4·7067 = 4·7693	
			−14·46

FAROE BANK—BUTT OF LEWIS
F.R.S. *SCOTIA*
8-11 May, 1952

SE. 3. 60°54′N 8°16′W 11.5.52
183 m. 1355-1417

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·07	35·41	27·45	64		
10	·08	·43	·46	64	·0064	
20	8·96	·35	·42	68	·0130	
30	·73	·36	·46	64	·0196	
50	·70	·35	·46	64	·0324	
75	·61	·35	·47	64	·0484	
100	·50	·33	·47	64	·0644	
150	·93	·35	·42	70	·0979	
175	·69	·34	·45	68	·1151	
[200]				67	·1320	
[300]				66	·1985	
[400]				66	·2645	
[500]				64	·3295	
[550]				63	·3613	99·6858

SE. 3. 60°45′N 8°08′W 11.5.52
842 m. 1230-1310

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·21	35·37	27·39	70		
10	·19	·43	·44	66	·0068	
20	·13	·43	·45	65	·0134	
30	·10	·43	·45	65	·0199	
50	8·93	·39	·45	65	·0329	
75	·93	·40	·46	65	·0491	
100	·78	·39	·48	64	·0652	
150	·67	·34	·46	66	·0977	
200	·61	·35	·47	66	·1307	
300	·37	·35	·51	65	·1962	
400	·19	·34	·53	64	·2607	
[500]	7·90	·36	·59	60	·3227	
[550]	·60	·36	·64	56	·3517	98·2858
600	6·86	·36	·75	46		

SE. 4. 60°35′N 8°00′W 11.5.52
940 m. 1030-1110

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·06	35·38	27·43	66		
10	·03	·40	·44	66	·0066	
20	8·94	·38	·44	66	·0132	
30	·80	·38	·46	64	·0197	
50	·93	·38	·45	65	·0326	
75	·76	·39	·48	63	·0486	
100	·73	·35	·45	66	·0647	
150	·54	·35	·48	64	·0972	
200	·43	·35	·50	63	·1290	
300	·15	·34	·54	62	·1915	
400	·04	·35	·56	61	·2530	
[500]	7·23	·32	·67	52	·3095	
[550]				30	·3300	95·3157
600	2·43	·18	28·10	7		

SE. 4. 60°23½′N 7°49½′W 11.5.52
759 m. 0715-0920

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·22	35·43	27·43	66		
10	·21	·36	·38	71	·0068	
20	·18	·43	·44	66	·0136	
30	·12	·40	·43	67	·0202	
50	8·82	·35	·44	66	·0335	
75	·75	·37	·46	65	·0499	
100	·72	·35	·45	66	·0663	
150	·72	·32	·43	69	·1001	
200	·50	·40	·53	61	·1326	
300	·28	·38	·54	62	·1941	
400	7·98	·28	·52	65	·2576	
[500]	5·56	·15	·76	42	·3111	
[550]				28	·3286	96·6620
600	1·93	·02	28·02	13		

SE. 2-3. 60°12′N 7°40′W 11.5.52
540 m. 0500-0600

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·22	35·37	27·39	70		
10	·12	·43	·45	65	·0068	
20	·13	·41	·43	67	·0134	
30	·12	·42	·44	66	·0200	
50	·03	·37	·42	68	·0334	
75	8·93	·39	·45	66	·0502	
100	·93	·43	·48	64	·0664	
150	·92	·35	·42	70	·0999	
200	·63	·35	·47	66	·1339	
300	·48	·32	·47	68	·2009	
400	·13	·32	·52	65	·2674	
[500]	7·10	·27	·64	55	·3274	
[550]				49	·3534	100·2560

E. 2. 59°56′N 7°27′W 11.5.52
576 m. 0200-0319

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·42	35·43	27·40	69		
10	·42	·43	·40	69	·0069	
20	·22	·39	·41	69	·0138	
30	·18	·41	·43	67	·0206	
50	·13	·41	·44	66	·0339	
75	·13	·43	·45	66	·0504	
100	·17	·41	·43	68	·0672	
150	8·77	·40	·48	65	·1004	
200	·78	·37	·46	67	·1334	
300	·79	·35	·44	71	·2024	
400	·72	·35	·45	72	·2739	
[500]	·57	·38	·50	69	·3444	
[550]	·45	·40	·53	68	·3786	103·0088

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
E. 2-3.			59°44′N 7°15′W			10/11.5.52
			969 m.			2255-0100
0	9·66	35·35	27·30	79		
10	·64	·35	·30	79	·0079	
20	·55	·21	·21	88	·0163	
30	·49	·35	·33	76	·0245	
50	·39	·39	·38	72	·0393	
75	·23	·39	·40	71	·0572	
100	·17	·34	·38	73	·0752	
150	·06	·39	·44	68	·1104	
200	·03	·35	·41	72	·1454	
300	8·90	·35	·43	72	·2174	
400	·86	·35	·43	74	·2904	
[500]	·85	·35	·43	76	·3654	
[550]				77	·4036	110·4437
600	·85	·35	·43	78		
E. 3.			59°31N′ 7°05′W			10.5.52
			1033 m.			1945-2130
0	10·04	35·36	27·25	83		
10	9·69	·38	·32	77	·0080	
20	·62	·38	·33	76	·0156	
30	·68	·39	·33	76	·0232	
50	·65	·34	·30	80	·0388	
75	·53	·35	·32	78	·0586	
100	·43	·37	·35	76	·0778	
150	·23	·36	·38	74	·1153	
200	·16	·37	·40	73	·1521	
300	8·98	·36	·42	73	·2251	
400	·89	·36	·44	73	·2981	
[500]	·83	·36	·44	75	·3721	
[550]				76	·4099	113·4770
600	·76	·36	·45	76		
E. 2.			59°17′N 6°53′W			10.5.52
			628 m.			1625-1830
0	10·25	35·39	27·23	85		
10	9·81	·38	·30	79	·0082	
20	·77	·37	·30	79	·0161	
30	·71	·38	·31	78	·0239	
50	·52	·37	·34	76	·0393	
75	·76	·38	·31	79	·0587	
100	·27	·41	·41	70	·0773	
150	·18	·35	·38	74	·1133	
200	·16	·34	·38	75	·1505	
300	·04	·36	·41	74	·2250	
[390]				75	·2920	57·3270
400	8·92	·35	·42	75	·3745	
500	·70	·33	·44	75	·4664	
[550]				74	·4117	113·6420
625	·20	·29	·49	72		
Var. 1.			59°00′N 6°40′W			10.5.52
			148 m.			1336-1436
0	9·82	35·42	27·33	76		
10	·53	·37	·34	75	·0076	
20	·49	·34	·32	77	·0152	
30	·41	·36	·35	74	·0228	
50	·35	·35	·35	75	·0377	
75	·22	·35	·37	74	·0563	
100	·13	·37	·40	71	·0744	
125	·09	·34	·39	73	·0924	
[135]				70	·0996	6·8008
145	·06	·40	·44	68	·1065	
[200]				70	·1445	
[300]				74	·2165	
[390]				75	·2835	55·3338

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
ESE. 4.			58°50′N 6°26′W			9.5.52
			124 m.			0110-0150
0	9·42	35·24	27·25	83		
10	·43	·22	·24	84	·0084	
20	·32	·30	·32	77	·0164	
30	·31	·28	·30	79	·0242	
50	·20	·31	·34	76	·0397	
75	8·88	·29	·39	72	·0582	
100	·75	·30	·41	70	·0760	
[115]				63	·0860	5·1243
120	·39	·36	·51	61	·0891	
[135]				66	·0986	6·9699
E/S. 3-4.			58°40′N 6°10′W			8.5.52
			111 m.			2300-2350
0	9·05	34·96	27·10	98		
10	·06	·97	·10	98	·0098	
20	·14	35·12	·21	88	·0191	
30	·10	·30	·35	74	·0272	
50	8·72	·30	·41	69	·0415	
75	·67	·31	·43	68	·0586	
105	·67	·30	·42	69	·0792	
[115]				67	·0860	5·2562

VOLUME TRANSPORT

		Km³/hr.
60°54′N 8°16′W.	$\Delta Q = \cdot 3613 \times 550 - 99\cdot 6858 = 99\cdot 0292$	+1·10
60°45′N 8°08′W.	$\Delta Q = \cdot 3517 \times 550 - 98\cdot 2858 = 95\cdot 1492$	+2·54
60°35′N 8°00′W.	$\Delta Q = \cdot 3300 \times 550 - 95\cdot 3157 = 86\cdot 1843$	+0·60
60°23½′N 7°49½′W.	$\Delta Q = \cdot 3286 \times 550 - 96\cdot 6620 = 84\cdot 0680$	−2·85
60°12′N 7°40′W.	$\Delta Q = \cdot 3534 \times 550 - 100\cdot 2560 = 94\cdot 1140$	−3·16
59°56′N 7°27′W.	$\Delta Q = \cdot 3786 \times 550 - 103\cdot 0088 = 105\cdot 2212$	−1·80
59°44′N 7°15′W.	$\Delta Q = \cdot 4036 \times 550 - 110\cdot 4437 = 111\cdot 5363$	−0·12
59°31′N 7°05′W.	$\Delta Q = \cdot 4099 \times 550 - 113\cdot 4770 = 111\cdot 9680$	−0·24
59°17′N 6°53′W.	$\Delta Q = \cdot 4117 \times 550 - 113\cdot 6420 = 112\cdot 7930$	
”	$\Delta Q = \cdot 2920 \times 390 - 57\cdot 3270 = 56\cdot 5530$	+0·38
59°00′N 6°40′W.	$\Delta Q = \cdot 2835 \times 390 - 55\cdot 3338 = 55\cdot 2312$	
”	$\Delta Q = \cdot 0996 \times 135 - 6\cdot 8008 = 6\cdot 6452$	+0·09
58°50′N 6°26′W.	$\Delta Q = \cdot 0986 \times 135 - 6\cdot 9699 = 6\cdot 3411$	
”	$\Delta Q = \cdot 0860 \times 115 - 5\cdot 1243 = 4\cdot 7657$	+0·04
58°40′N 6°10′W.	$\Delta Q = \cdot 0860 \times 115 - 5\cdot 2562 = 4\cdot 6338$	
		−3·42

NOLSØ, FAROE—FLUGGA, SHETLAND

F.R.S. *SCOTIA*

18-19 May, 1952

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
S. 1.			62°00′N 6°12′W			18.5.52
			119 m.			1045-1150
0	7·18	35·19	27·57	53		
10	·04	·17	·57	53	·0053	
20	·01	·11	·52	58	·0109	
30	·00	·21	·61	50	·0163	
50	6·98	·15	·56	55	·0268	
75	7·00	·16	·57	54	·0404	
100	·00	·18	·58	54	·0539	
115	6·98	·08	·52	60	·0625	
[195]				54	·1081	10·3903

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta \mathrm{D}\,dz$
Var. 1-2.			61°54′N 5°45′W			18.5.52
			265 m.			1255-1355
0	7·92	35·14	27·43	66		
10	·62	·25	·55	55	·0060	
20	·62	·17	·49	61	·0118	
30	·59	·18	·51	59	·0178	
50	·42	·20	·54	57	·0294	
75	·20	·20	·57	54	·0433	
100	6·97	·23	·63	49	·0562	
150	·97	·18	·60	53	·0817	
[195]				54	·1058	10·5579
200	7·23	·24	·60	54	·1085	
[210]				54	·1139	12·2057
260	6·96	·21	·61	54		
Var. 1-2.			61°49′N 5°21′W			18.5.52
			157 m.			1520-1543
0	7·88	35·20	27·48	62		
10	·67	·19	·50	60	·0061	
20	·66	·10	·44	66	·0124	
30	·64	·19	·50	60	·0187	
50	·59	·19	·51	60	·0307	
75	·02	·21	·60	51	·0446	
100	6·77	·12	·58	54	·0577	
150	·77	·18	·63	50	·0837	
[195]				54	·1071	10·8205
[200]				54	·1098	
[210]				54	·1152	12·4877
SE. 2-3.			61°42′N 4°51′W			18.5.52
			231 m.			1730-1823
0	8·22	35·23	27·45	64		
10	·02	·19	·45	65	·0064	
20	7·98	·19	·46	64	·0128	
30	·93	·19	·47	63	·0192	
50	·90	·22	·49	61	·0316	
75	·46	·21	·55	56	·0462	
100	·35	·18	·55	57	·0603	
150	·20	·19	·57	56	·0885	
[195]				55	·1135	11·3647
200	·21	·21	·58	55	·1163	
[225]	6·91	·19	·61	53	·1298	
[300]				52	·1692	
[365]				30	·1958	38·0904
SE. 3-4.			61°35′N 4°15′W			18.5.52
			750 m.			2020-2204
0	8·12	35·24	27·47	62		
10	7·94	·24	·50	60	·0061	
20	·88	·20	·48	62	·0121	
30	·83	·24	·51	59	·0181	
50	·81	·25	·52	59	·0299	
75	·60	·19	·52	59	·0447	
100	·51	·23	·55	57	·0592	
150	·38	·20	·55	58	·0880	
200	·28	·25	·61	53	·1158	
300	6·66	·15	·61	52	·1683	
[365]				30	·1949	37·7678
[380]				24	·1989	40·7213
400	2·20	34·99	·97	17		
SSE. 4.			61°28′N 3°42′W			18/19.5.52
			1188 m.			2345-0035
0	8·29	35·24	27·45	64		
10	·28	·19	·41	68	·0066	
20	·22	·19	·42	68	·0134	
30	·08	·21	·45	65	·0200	
50	7·76	·22	·51	60	·0325	
75	·61	·19	·51	60	·0475	
100	·42	·20	·54	58	·0623	
150	·41	·21	·55	58	·0913	
200	·45	·23	·56	57	·1201	
300	5·89	·07	·64	51	·1741	
[380]				40	·2105	42·4165
400	4·08	34·97	·78	37	·2182	46·7035
[500]	1·96	·94	·95	20		
SSE. 3-4.			61°21′N 3°10′W			19.5.52
			1271 m.			0220-0445
0	8·83	35·26	27·37	72		
10	·83	·26	·37	72	·0072	
20	·83	·27	·37	72	·0144	
30	·49	·26	·42	68	·0214	
50	7·88	·26	·51	60	·0342	
75	·70	·26	·54	57	·0488	
100	·44	·25	·58	54	·0627	
150	·33	·20	·56	57	·0905	
200	6·97	·21	·62	52	·1177	
300	5·71	·12	·71	44	·1657	
400	3·55	·03	·88	27	·2012	44·8603
[490]				15	·2201	63·8188
[500]	1·28	34·94	28·00	14		
SE. 5.			61°14′N 2°40′W			19.5.52
			1188 m.			0630-0733
0	8·81	35·27	27·38	71		
10	·76	·27	·39	70	·0070	
20	·54	·25	·40	70	·0140	
30	·41	·26	·43	67	·0208	
50	·13	·21	·44	66	·0341	
75	7·82	·26	·52	59	·0497	
100	·53	·19	·50	61	·0647	
150	·04	·22	·62	51	·0927	
200	6·73	·26	·69	45	·1167	
300	·41	·24	·70	45	·1617	
400	3·97	·18	·96	20	·1942	
[490]				6	·2059	62·2300
[500]	1·15	·06	28·10	4	·2064	
[520]				4	·2072	68·4275
600	0·13	34·94	·07	6		
SE. 4-5.			61°08′N 2°10′W			19.5.52
			686 m.			0950-1100
0	8·60	35·31	27·44	65		
10	·58	·26	·40	69	·0067	
20	·52	·26	·41	69	·0136	
30	·36	·27	·45	65	·0203	
50	·28	·27	·46	64	·0332	
75	·13	·26	·48	63	·0491	
100	7·69	·26	·54	58	·0642	
150	·13	·25	·63	50	·0912	
200	6·95	·24	·64	50	·1162	
300	·30	·18	·68	47	·1647	
400	5·28	·17	·80	36	·2062	
[405]				36	·2080	50·9800
500	3·38	34·99	·88	28	·2384	
[520]				25	·2437	77·0050
680	–0·98	·92	28·12	–1		
Var. 1-2.			61°01′N 1°36′W			19.5.52
			156 m.			1327-1417
0	9·26	35·35	27·34	75		
10	·43	·34	·33	76	·0076	
20	·41	·34	·33	76	·0152	
30	·41	·35	·34	75	·0228	
50	·31	·42	·41	69	·0372	
75	·13	·41	·44	67	·0542	
100	·04	·31	·45	66	·0708	
[130]				60	·0897	6·0545
150	8·77	·38	·47	65	·1022	
[200]				53	·1317	
[300]				48	·1822	
[400]				42	·2272	
[405]				42	·2293	51·1272

SW. 2. 60°56′N 1°00′W 19.5.52
104 m. 1630-1700

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	9·23	35·33	27·36	73		
10	·17	·33	·37	72	·0072	
20	·04	·32	·38	71	·0144	
30	8·99	·35	·41	69	·0214	
50	·82	·35	·44	66	·0349	
75	·42	·35	·50	61	·0508	
100	·13	·32	·52	60	·0659	
[130]				57	·0835	5·6570

VOLUME TRANSPORT

		Km.³/hr.
62°00′N 6°12′W.	ΔQ=·1081×195−10·3903=10·6892	+0·17
61°54′N 5°45′W.	ΔQ=·1058×195−10·5579=10·0731	
”	ΔQ=·1139×210−12·2057=11·7133	+0·00
61°48′N 5°21′W.	ΔQ=·1152×210−12·4877=11·7043	
”	ΔQ=·1071×195−10·8205=10·0640	−0·20
61°42′N 4°51′W.	ΔQ=·1135×195−11·3647=10·7678	
”	ΔQ=·1958×365−38·0904=33·3766	+0·00
61°35′N 4°15′W.	ΔQ=·1949×365−37·7678=33·3707	
”	ΔQ=·1989×380−40·7213=34·8607	−0·76
61°28′N 3°42′W.	ΔQ=·2105×380−42·4165=37·5735	
”	ΔQ=·2182×400−46·7035=40·5765	+1·39
61°21′N 3°10′W.	ΔQ=·2012×400−44·8603=35·6197	
”	ΔQ=·2201×490−63·8188=44·0302	+1·51
61°14′N 2°40′W.	ΔQ=·2059×490−62·2300=38·6610	
”	ΔQ=·2072×520−68·4275=39·3165	−2·93
61°08′N 2°10′W.	ΔQ=·2437×520−77·0050=49·7190	
”	ΔQ=·2080×405−50·9800=33·2600	−2·39
61°01′N 1°36′W.	ΔQ=·2293×405−51·1272=41·7393	
”	ΔQ=·0897×130− 6·0545= 5·6065	+0·12
60°56′N 1°00′W.	ΔQ=·0835×130− 5·6570= 5·1980	
		−3·09

NOLSØ, FAROE—FLUGGA, SHETLAND

Danish Research Vessel, *DANA*

31 May–2 June, 1952

62°00′N 6°12′W 2.6.52
120 m. 0020-0045

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	7·56	35·26	27·58	52		
10	·55	·26	·58	52	·0052	
20	·54	·25	·56	54	·0105	
30	·54	·25	·56	54	·0159	
50	·47	·24	·57	54	·0267	
75	·42	·24	·58	53	·0401	
115	·36	·25	·60	52	·0611	
[180]				52	·0949	8·5915

61°54½′N 5°45′W 1.6.52
244 m. 2200-

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	7·78	35·25	27·53	57		
10	·78	·24	·53	57	·0057	
20	·75	·25	·54	56	·0113	
30	·73	·26	·56	54	·0168	
50	·68	·23	·54	57	·0279	
75	·60	·21	·53	58	·0423	
100	·47	·22	·56	56	·0565	
150	·02	·23	·62	51	·0833	
[180]				52	·0987	9·0385
200	6·92	·21	·62	52	·1091	
[215]				52	·1169	12·8115
235	·89	·21	·63	51		

61°49′N 5°21′W 1.6.52
185 m. 1900-1925

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	7·91	35·26	27·52	58		
10	·87	·26	·53	57	·0058	
20	·82	·21	·50	60	·0116	
30	·75	·23	·52	58	·0175	
50	·72	·23	·52	59	·0292	
75	·69	·21	·51	59	·0440	
100	·35	·25	·60	52	·0579	
180	·02	·23	·63	50	·0987	
[215]				52	·1165	12·9473
[220]				52	·1191	13·5363

61°42½′N 4°51′W 1.6.52
ca. 240-270 m. 1630-

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	7·94	35·28	27·53	57		
10	·93	·26	·52	58	·0058	
20	·90	·27	·53	57	·0116	
30	·85	·26	·53	57	·0173	
50	·84	·23	·50	61	·0291	
75	·82	·26	·54	57	·0439	
100	·80	·25	·53	59	·0584	
150	·55	·25	·57	56	·0872	
200	·20	·26	·63	51	·1140	
[220]				53	·1244	13·9698
235	·20	·23	·60	54	·1324	
[300]				42	·1636	
[320]				33	·1711	28·8628

61°35′N 4°15′W 1.6.52
880 m.

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	8·33	35·17	27·37	72		
10	7·98	·16	·42	67	·0070	
20	·94	·19	·45	65	·0136	
30	·86	·21	·49	61	·0199	
50	·84	·17	·47	63	·0323	
75	6·12	·16	·68	44	·0457	
100	5·63	·16	·75	37	·0558	
150	·18	·16	·80	33	·0733	
200	4·50	·08	·82	32	·0895	
300	2·52	34·99	·94	20	·1155	
[320]				18	·1193	22·9668
[370]				13	·1271	29·1268
400	0·54	·92	28·03	10		

61°28′N 3°42′W 1.6.52
1300 m. 1040-

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
0	9·14	35·34	27·38	71		
10	·06	·34	·39	70	·0070	
20	·06	·34	·39	70	·0140	
30	·04	·34	·40	70	·0210	
50	·00	·35	·41	69	·0349	
75	8·06	·28	·50	61	·0511	
100	7·78	·26	·54	58	·0660	
150	·39	·25	·59	54	·0940	
200	6·96	·23	·64	50	·1200	
300	·22	·16	·68	47	·1685	
[370]				40	·1989	40·0468
400	4·52	·06	·79	37	·2105	
[470]				27	·2329	61·7068
500	2·38	34·95	·92	23		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
			61°21′N 3°10′W			1.6.52
			1295 m.			0745-0810
0	8·89	35·26	27·36	73		
10	·88	·27	·37	72	·0072	
20	·87	·26	·36	73	·0144	
30	·35	·24	·43	67	·0214	
50	·34	·26	·44	66	·0347	
75	·19	·31	·51	60	·0505	
100	·12	·34	·54	58	·0653	
150	7·65	·31	·60	53	·0931	
200	·30	·26	·61	53	·1196	
300	6·75	·23	·66	49	·1706	
400	5·68	·18	·76	41	·2156	
[470]				28	·2398	62·4330
500	2·69	34·97	·92	23	·2474	
[530]				20	·2538	77·2590
600	0·86	·93	28·02	12		
			61°14′N 2°40′W			1.6.52
			1000 m.			0505-0545
0	9·47	35·34	27·32	77		
10	·47	·34	·32	77	·0077	
20	·43	·33	·32	77	·0154	
30	·35	·36	·36	74	·0230	
50	·15	·36	·39	71	·0375	
75	·02	·36	·42	69	·0550	
100	8·90	·35	·43	68	·0721	
150	·76	·36	·46	66	·1056	
200	·47	·31	·46	67	·1388	
300	7·05	·19	·59	56	·2003	
400	6·60	·21	·66	51	·2538	
500	5·09	·09	·76	41	·2998	
[530]				37	·3115	90·7180
[560]				32	·3219	100·2190
600	2·66	34·96	·90	26		
			61°08′N 2°10′W			1.6.52
			515 m.			0210-0240
0	9·52	35·39	27·36	73		
10	·50	·39	·36	73	·0073	
20	·49	·39	·36	73	·0146	
30	·42	·40	·38	72	·0218	
50	·37	·39	·38	72	·0362	
75	·23	·40	·41	70	·0540	
100	·05	·36	·41	70	·0715	
150	8·83	·39	·47	65	·1053	
200	·78	·38	·47	66	·1381	
300	·36	·33	·50	65	·2036	
[330]				63	·2228	37·5903
400	7·35	·27	·60	57	·2648	
500	4·97	·10	·78	39	·3128	
[560]				31	·3338	102·9343
			61°01′N 1°36′W			31.5.52
			144 m.			2200-2240
0	9·67	35·36	27·31	78		
10	·67	·35	·30	79	·0078	
20	·63	·36	·31	78	·0156	
30	·60	·35	·31	78	·0234	
50	·55	·37	·33	77	·0389	
75	·03	·37	·42	69	·0571	
100	8·63	·37	·48	64	·0737	
[125]				64	·0897	5·8515
[141]	·62	—				
[150]				64	·1057	
[200]				64	·1377	
[300]				65	·2022	
[330]				65	·2217	37·7325
			60°53′N 1°06′W			31.5.52
			108 m.			
0	9·52	35·33	27·31	78		
10	·46	·32	·31	78	·0078	
20	·35	·32	·33	76	·0155	
30	·30	·32	·34	75	·0231	
50	·30	·32	·34	76	·0382	
75	8·51	·32	·46	65	·0558	
100	·50	·32	·47	64	·0719	
[125]				64	·0879	5·7302

VOLUME TRANSPORT

		Km.³/hr.
62°00′N 6°12′W.	ΔQ=·0949×180— 8·5915= 8·4905	−0·07
61°54½′N 5°45′W.	ΔQ=·0987×180— 9·0385= 8·7275	
„	ΔQ=·1169×215— 12·8115=12·3220	+0·06
61°49′N 5°21′W.	ΔQ=·1165×215— 12·9473=12·1002	
„	ΔQ=·1191×220— 13·5363=12·6657	−0·21
61°42½′N 4°51′W.	ΔQ=·1244×220— 13·9698=13·3982	
„	ΔQ=·1711×320— 28·8628=25·8892	+3·00
61°35′N 4°15′W.	ΔQ=·1193×320— 22·9668=15·2092	
„	ΔQ=·1271×370— 29·1268=17·9002	−4·39
61°28′N 3°42′W.	ΔQ=·1989×370— 40·0468=33·5492	
„	ΔQ=·2329×470— 61·7068=47·7562	−0·71
61°21′N 3°10′W.	ΔQ=·2398×470— 62·4330=50·2730	
„	ΔQ=·2538×530— 77·2590=57·2550	−4·82
61°14′N 2°40′W.	ΔQ=·3115×530— 90·7180=74·3770	
„	ΔQ=·3219×560—100·2190=80·0450	−1·11
61°08′N 2°10′W.	ΔQ=·3338×560—102·9343=83·9937	
„	ΔQ=·2228×330— 37·5903=35·9337	+0·14
61°01′N 1°36′W.	ΔQ=·2217×330— 37·7325=35·4285	
„	ΔQ=·0897×125— 5·8515= 5·3610	+0·03
60°53′N 1°06′W.	ΔQ=·0879×125— 5·7302= 5·2573	
		−8·08

NOLSØ, FAROE—FLUGGA, SHETLAND
F.R.S. *SCOTIA*
21-22 June, 1952

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
WNW. 4.			62°00′N 6°12′W			21.6.52
			110 m.			1020-1105
0	7·98	35·23	27·48	62		
10	·99	·20	·45	64	·0063	
20	·97	·19	·45	65	·0127	
30	·97	·18	·44	66	·0193	
50	·97	·20	·46	64	·0323	
75	·99	·23	·48	63	·0482	
105	·99	·23	·48	63	·0671	
[185]				55	·1143	10·7942
			61°54′N 5°45′W			21.6.52
NW. 5.			258 m.			1240-1420
0	8·03	35·21	27·45	64		
10	·02	·22	·46	64	·0064	
20	·02	·21	·45	65	·0128	
30	·01	·22	·46	64	·0192	
50	·00	·22	·47	63	·0319	
75	7·87	·22	·50	61	·0474	
100	·85	·22	·50	61	·0626	
150	·23	·22	·59	54	·0914	
[185]				54	·1103	10·5450
200	·22	·23	·60	54	·1184	
[205]				54	·1211	12·8568
250	·23	·21	·58	56		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
WNW. 6.			61°49′N 5°21′W			21.6.52
			156 m.			1810-1845
0	8·06	35·19	27·43	66		
10	·08	·21	·45	64	·0065	
20	·08	·18	·42	68	·0131	
30	·02	·18	·43	67	·0199	
50	7·92	·19	·45	65	·0331	
75	·82	·23	·50	61	·0489	
100	·69	·23	·52	59	·0639	
150	·42	·22	·55	58	·0931	
[195]				57	·1190	11·9577
[205]				57	·1247	13·1762
WNW. 6.			61°42′N 4°51′W			21.6.52
			238 m.			2030-2135
0	7·92	35·25	27·50	60		
10	·92	·26	·51	59	·0060	
20	·92	·25	·50	60	·0120	
30	·92	·26	·51	59	·0180	
50	·88	·26	·52	59	·0298	
75	·74	·22	·50	61	·0448	
100	·52	·17	·49	62	·0602	
150	·18	·17	·56	56	·0897	
[195]				58	·1153	11·3530
200	·27	·18	·55	58	·1182	
230	6·93	·18	·60	54	·1350	
[305]				44	·1718	27·2398
W. 5-6.			61°35′N 4°15′W			21/22.6.52
			906 m.			2325-0130
0	9·01	35·26	27·34	75		
10	·01	·26	·34	75	·0075	
20	8·93	·26	·35	74	·0149	
30	·02	·24	·48	62	·0217	
50	7·92	·20	·46	64	·0343	
75	·41	·20	·55	56	·0493	
100	·31	·19	·56	56	·0633	
150	·22	·16	·55	57	·0915	
200	5·50	·16	·67	46	·1173	
300	3·85	34·99	·82	32	·1563	
[305]				31	·1579	26·9005
[370]				22	·1751	37·7230
400	1·25	·88	·96	17		
WNW. 6.			61°28′N 3°42′W			22.6.52
			1262 m.			0310-0445
0	8·74	35·27	27·39	70		
10	·74	·26	·38	71	·0070	
20	·74	·26	·38	71	·0141	
30	·73	·25	·37	72	·0213	
50	·73	·25	·37	73	·0358	
75	·74	·27	·39	72	·0539	
100	·69	·26	·39	72	·0719	
150	7·66	·25	·55	58	·1044	
200	·28	·18	·56	57	·1332	
300	6·70	·16	·61	54	·1887	
[370]				44	·2230	44·4342
400	5·03	·07	·76	40	·2356	
[420]				39	·2435	56·1042
[500]	2·65	34·91	·79	35		

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
NW/W. 6.			61°21′N 3°10′W			22.6.52
			1371 m.			0633-1030
0	9·41	35·31	27·31	78		
10	·44	·32	·31	78	·0078	
20	·44	·33	·32	77	·0156	
30	·44	·34	·33	76	·0232	
50	·21	·31	·34	76	·0384	
75	·21	·34	·37	74	·0572	
100	·11	·35	·39	72	·0754	
150	·11	·35	·39	73	·1116	
200	8·99	·35	·41	72	·1478	
300	·30	·32	·50	65	·2163	
400	5·62	34·97	·61	55	·2763	
[420]				53	·2871	63·4475
600	3·69	·94	·80	37	·3681	
[605]				36	·3699	124·2605
800	0·21	·87	28·02	11		
NW/W. 6.			61°14′N 2°40′W			22.6.52
			1143 m.			1130-
0	9·27	35·30	27·33	76		
10	·27	·29	·32	77	·0076	
20	·27	·28	·31	78	·0154	
30	·27	·30	·33	76	·0231	
50	·33	·34	·34	76	·0383	
75	·20	·34	·37	74	·0571	
100	8·94	·28	·37	74	·0756	
150	·62	·28	·41	71	·1118	
200	9·10	·34	·39	74	·1480	
300	7·70	·21	·51	64	·2170	
400	6·58	·19	·65	52	·2750	
[500]	5·13	·19	·84	34	·3180	
600	3·42	·10	·95	22	·3370	
[605]				22	·3381	121·9286
[615]				21	·3403	125·3206
[700]	0·93	34·88	·98	16		
WNW. 6.			61°08′N 2°10′W			22.6.52
			622 m.			1430-1545
0	9·91	35·34	27·25	83		
10	·91	·33	·24	84	·0084	
20	·90	·26	·19	89	·0170	
30	·90	·34	·25	84	·0256	
50	·86	·34	·26	83	·0423	
75	·76	·34	·28	82	·0629	
100	·88	·34	·26	85	·0838	
150	·84	·33	·25	87	·1268	
200	·22	·33	·36	77	·1678	
300	·09	·35	·40	75	·2438	
[365]				69	·2906	54·7878
400	8·32	·35	·52	65	·3140	
[500]	6·01	·19	·73	45	·3690	
600	3·23	34·95	·85	31	·4070	
[615]				30	·4116	144·4578
WNW. 4.			61°01′N 1°36′W			22.6.52
			156 m.			
0	9·73	35·33	27·27	81		
10	·78	·34	·27	82	·0082	
20	·78	·34	·27	82	·0164	
30	·78	·34	·27	82	·0246	
50	·76	·35	·28	82	·0410	
75	·64	·36	·31	79	·0611	
100	·24	·34	·36	75	·0803	
[130]				73	·1025	6·8107
150	·00	·35	·41	71	·1169	
[200]				75	·1534	
[300]				75	·2284	
[365]				72	·2762	51·2517

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
W. 4.			60°56′N 1°00′W 106 m.			22.6.52
0	9·74	35·34	27·28	80		
10	·76	·33	·27	82	·0081	
20	·76	·34	·28	81	·0163	
30	·76	·33	·27	82	·0245	
50	·73	·33	·27	82	·0409	
75	8·81	·31	·41	70	·0599	
100	·62	·31	·44	67	·0770	
[130]				69	·0974	6·6077

VOLUME TRANSPORT

		Km.³/hr.
62°00′N 6°12′W.	ΔQ=·1143×185− 10·7942= 10·3513	+0·14
61°54′N 5°45′W.	ΔQ=·1103×185− 10·5450= 9·8605	
,,	ΔQ=·1211×205− 12·8568= 11·9687	−0·12
61°49′N 5°21′W.	ΔQ=·1247×205− 13·1762= 12·3873	
,,	ΔQ=·1190×195− 11·9577= 11·2473	+0·03
61°42′N 4°51′W.	ΔQ=·1153×195− 11·3530= 11·1305	
,,	ΔQ=·1718×305− 27·2398= 25·1592	+1·09
61°35′N 4°15′W.	ΔQ=·1579×305− 26·9005= 21·2590	
,,	ΔQ=·1751×370− 37·7230= 27·0640	−3·09
61°28′N 3°42′W.	ΔQ=·2230×370− 44·4342= 38·0758	
,,	ΔQ=·2435×420− 56·1042= 46·1658	−3·08
61°21′N 3°10′W.	ΔQ=·2871×420− 63·4475= 57·1345	
,,	ΔQ=·3699×605−124·2605= 99·5290	+4·76
61°14′N 2°40′W.	ΔQ=·3381×605−121·9286= 82·6219	
,,	ΔQ=·3403×615−125·3206= 83·9639	−7·12
61°08′N 2°10′W.	ΔQ=·4116×615−144·4578=108·6762	
,,	ΔQ=·2906×365− 54·7878= 51·2812	+0·49
61°01′N 1°36′W.	ΔQ=·2762×365− 51·2517= 49·5613	
,,	ΔQ=·1025×130− 6·8107= 6·5143	+0·13
60°56′N 1°00′W.	ΔQ=·0974×130− 6·6077= 6·0543	
		−6·77

LATITUDE 62°15′N, LONGITUDE 9°30′W —FAROE BANK—BUTT OF LEWIS

F.R.S. *SCOTIA*

5-7 July, 1952

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
NNE. 4.			62°15′N 9°30′W 714 m.			7.7.52 1840-1940
0	9·91	35·29	27·21	87		
10	·90	·27	·19	89	·0088	
20	·57	·27	·25	84	·0174	
30	·53	·28	·26	83	·0258	
50	·02	·31	·37	73	·0414	
75	8·97	·31	·38	73	·0596	
100	·73	·35	·45	66	·0770	
150	·54	·35	·48	64	·1095	
200	·41	·34	·49	64	·1415	
300	·02	·27	·50	65	·2060	
400	7·83	·27	·53	64	·2705	
500	·45	·25	·57	62	·3335	
600	4·82	·14	·83	36	·3825	
[620]				34	·3895	129·4905
700	2·16	34·93	·92	24		
NNE. 5.			62°02′N 9°18′W 659 m.			7.7.52 1615-1705
0	9·57	35·28	27·26	82		
10	·57	·26	·24	84	·0083	
20	·55	·27	·25	84	·0167	
30	·37	·31	·32	77	·0247	
50	·24	·28	·31	79	·0403	
75	·17	·29	·33	77	·0598	
100	·17	·26	·31	80	·0794	
150	8·80	·33	·42	70	·1169	
200	·65	·33	·45	68	·1514	
300	·14	·32	·52	63	·2169	
400	7·76	·29	·56	61	·2789	
500	4·47	·13	·86	31	·3249	
[550]	2·48	·03	·98	18	·3371	
[600]	1·38	34·92	·98	16	·3456	
[620]				16	·3488	129·5862
650	1·00	·88	·98	16	·3536	
[700]				?45	·3688	158·1822
NE. 4.			61°48′N 9°06′W 860 m.			7.7.52 1242-1400
0	10·42	35·28	27·12	96		
10	·39	·29	·13	95	·0096	
20	·32	·30	·15	93	·0190	
30	·17	·28	·16	93	·0283	
50	9·67	·29	·26	83	·0459	
75	·28	·29	·32	78	·0660	
100	8·88	·29	·38	73	·0849	
150	·63	·31	·44	68	·1201	
200	·74	·31	·42	71	·1549	
300	·28	·31	·49	66	·2234	
400	·13	·26	·48	69	·2909	
500	7·88	·25	·51	68	·3594	
600	·56	·23	·54	66	·4264	
[700]				65	·4919	178·8045
[705]				65	·4951	181·2720
[800]	6·95	·16	·58	65		
850	·80	·15	·59	65		
E. 4.			61°35′N 8°53′W 549 m.			7.7.52 1026-1145
0	10·39	35·29	27·13	95		
10	·36	·32	·16	92	·0094	
20	·36	·30	·14	94	·0187	
30	·27	·35	·20	89	·0279	
50	9·65	·32	·28	82	·0450	
75	·33	·31	·33	77	·0649	
100	·17	·30	·35	76	·0840	
150	8·91	·35	·43	69	·1202	
200	·47	·32	·47	66	·1540	
300	·27	·36	·53	63	·2185	
400	·07	·30	·52	65	·2825	
[420]				65	·2955	65·7995
500	6·88	·10	·54	63	·3467	
[600]				60	·4082	
[705]				59	·4707	175·3747
			61°21½′N 8°41′W 285 m.			7.7.52 0752-0840
0	10·18	35·36	27·22	86		
10	·16	·33	·20	88	·0087	
20	9·77	·29	·24	85	·0173	
30	·39	·36	·35	74	·0253	
50	·06	·30	·36	74	·0401	
75	8·86	·33	·42	69	·0580	
100	·77	·33	·43	68	·0751	
150	·58	·30	·44	68	·1091	
[190]				69	·1365	13·4475
200	·59	·30	·44	69	·1434	
[300]				63	·2094	
[400]				63	·2724	
[420]				63	·2850	62·1510

NNE. 4. 61°08′N 8°29′W 7.7.52
100 m. 0520-0550

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·44	35·28	27·28	80		
10	·38	·29	·30	79	·0080	
20	·32	·29	·31	78	·0158	
30	·27	·28	·32	77	·0236	
50	·27	·29	·33	77	·0390	
75	·28	·28	·31	79	·1585	
100	·26	·28	·32	79	·1783	
[110]				78	·1861	9·4828
[190]				68	·2445	26·7068

VOLUME TRANSPORT

		Km³/hr.
62°15′N 9°30′W	ΔQ=·3895×620−129·4905=111·9995	+ 7·07
62°02′N 9°18′W	ΔQ=·3488×620−129·5862= 86·6698	
”	ΔQ=·3688×700−158·1822= 99·9778	−18·35
61°48′N 9°06′W	ΔQ=·4919×700−178·8045=165·5255	
”	ΔQ=·4951×705−181·2720=167·7735	+ 3·17
61°35′N 8°53′W	ΔQ=·4707×705−175·3747=156·4688	
”	ΔQ=·2955×420− 65·7995= 58·3105	+ 0·24
61°21½′N 8°41′W	ΔQ=·2850×420− 62·1510= 57·4490	
”	ΔQ=·1365×190− 13·4475= 12·4875	− 2·05
61°08′N 8°29′W	ΔQ=·2445×190− 26·7068= 19·7482	
”	ΔQ=·1861×110− 9·4828= 10·9882	+ 1·83
60°54′N 8°16′W	ΔQ=·0849×110− 4·8383= 4·5007	
		− 8·09

N/W. 2. 60°54′N 8°16′W 6.7.52
125 m. 2325-2345

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·08	35·28	27·18	90		
10	9·90	·28	·21	87	·0088	
20	·61	·28	·26	83	·0173	
30	·47	·28	·28	81	·0255	
50	·01	·28	·35	75	·0411	
75	8·91	·30	·39	72	·0595	
100	·86	·28	·38	73	·0776	
[110]				73	·0849	4·8383
120	·90	·30	·39	73	·0922	
[150]				73	·1141	
[200]				72	·1503	
[300]				72	·2223	
[400]				71	·2938	
[500]				58	·3583	
[550]				44	·3838	111·0208

N/W. 2. 60°45′N 8°08′W 6.7.52
604 m. 2132-2210

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·85	35·31	27·06	101		
10	·45	·31	·13	95	·0098	
20	9·94	·30	·14	94	·0192	
30	·75	·33	·27	82	·0280	
50	·69	·32	·27	83	·0445	
75	·26	·32	·34	76	·0644	
100	·09	·31	·37	74	·0832	
150	·14	·31	·35	77	·1210	
200	8·82	·31	·41	72	·1582	
300	·70	·31	·43	72	·2302	
400	·46	·30	·46	71	·3017	
[500]	7·15	·24	·61	58	·3662	
[550]				42	·3912	114·7912
580	5·17	·17	·83	36		

N/W. 2. 60°35′N 8°00′W 6.7.52
860 m. 1952-2045

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·64	35·34	27·12	96		
10	·16	·34	·21	87	·0092	
20	9·96	·32	·23	86	·0178	
30	·74	·34	·28	81	·0262	
50	·57	·34	·31	79	·0422	
75	·30	·34	·35	75	·0614	
100	·29	·34	·35	76	·0803	
150	·11	·34	·39	73	·1175	
200	8·88	·34	·42	71	·1535	
300	·31	·31	·49	66	·2220	
400	7·79	·25	·53	64	·2870	
500	6·25	·18	·69	49	·3435	
[550]				38	·3653	109·3412
600	0·62	34·95	28·06	27		

Var. 1. 60°23½′N 7°49½′W 6.7.52
869 m. 1720-1830

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·28	35·34	27·01	106		
10	10·65	·34	·12	96	·0101	
20	·37	·35	·18	90	·0194	
30	·19	·37	·23	86	·0282	
50	9·90	·37	·28	82	·0450	
75	·63	·38	·33	77	·0649	
100	·16	·37	·40	71	·0834	
150	·03	·37	·42	70	·1186	
200	8·85	·35	·43	70	·1536	
300	·78	·35	·44	71	·2241	
400	·47	·31	·46	71	·2951	
500	6·75	·21	·65	53	·3571	
[550]	4·97	·21	·87	32	·3783	112·0906
600	2·75	·21	28·09	8		

Calm. 60°12′N 7°40′W 6.7.52
686 m. 1450-1605

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	10·92	35·35	27·08	99		
10	·07	·35	·23	85	·0092	
20	·07	·34	·22	87	·0178	
30	·07	·34	·22	87	·0265	
50	9·88	·34	·25	84	·0436	
75	·97	·32	·22	88	·0651	
100	·77	·35	·28	83	·0865	
150	·57	·36	·32	80	·1273	
200	·60	·35	·31	82	·1678	
300	8·75	·35	·45	70	·2438	
400	·70	·35	·46	71	·3143	
500	6·25	·24	·74	44	·3718	
[550]	3·55	·15	·98	19	·3876	118·8548
[600]	0·95	·03	28·10	4	·3934	
625	−0·15	34·97	·12	1	·3940	

Calm. 59°56′N 7°27′W 6.7.52
622 m. 1152-1250

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	11·76	35·32	26·90	117		
10	·01	·37	27·08	100	·0108	
20	10·78	·37	·12	96	·0206	
30	·64	·37	·14	94	·0301	
50	·32	·39	·22	87	·0482	
75	9·83	·42	·32	78	·0688	
100	·70	·37	·31	80	·0886	
150	10·14	·37	·23	89	·1308	
200	9·19	·42	·43	70	·1706	
300	8·99	·39	·44	71	·2411	
400	·83	·35	·43	74	·3136	
500	·73	·35	45	74	·3876	
550	·63	·35	·47	73	·4244	121·3775

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
S. 1.			59°44′N 7°15′W 1020 m.			6.7.52 0816-0925
0	11·83	35·35	26·91	116		
10	·08	·35	27·05	102	·0109	
20	·06	·35	·05	103	·0211	
30	10·68	·35	·12	96	·0311	
50	·37	·35	·18	91	·0498	
75	9·83	·44	·34	77	·0708	
100	·58	·44	·38	73	·0896	
150	·45	·44	·40	72	·1258	
200	·19	·42	·43	70	·1613	
300	8·98	·43	·48	68	·2303	
400	·89	·34	·42	75	·3018	
500	·80	·35	·45	74	·3763	
[550]	·78	·35	·45	75	·4135	117·1945
600	·73	·35	·45	76		
Calm.			59°31′N 7°05′W 1033 m.			6.7.52 0545-0640
0	11·32	35·35	27·00	107		
10	·09	·35	·05	102	·0104	
20	10·94	·35	·07	101	·0206	
30	·92	·36	·09	99	·0307	
50	·86	·35	·09	100	·0506	
75	·65	·37	·14	96	·0751	
100	9·68	·36	·30	81	·0972	
150	·55	·35	·32	80	·1374	
200	·52	·39	·35	78	·1769	
300	8·94	·37	·43	72	·2519	
400	·85	·35	·43	74	·3249	
500	·79	·31	·41	78	·4009	
[550]				79	·4401	126·3190
600	·75	·30	·41	80		
Var. 1-2.			59°17′N 6°53′W 586 m.			6.7.52 0250-0425
0	12·43	35·43	26·85	121		
10	11·56	·35	·96	111	·0116	
20	·48	·41	27·02	106	·0224	
30	·44	·41	·03	105	·0330	
50	10·61	·41	·18	91	·0526	
75	·19	·43	·27	83	·0744	
100	9·97	·39	·28	83	·0952	
150	·87	·35	·26	86	·1374	
200	·56	·35	·32	81	·1792	
300	·57	·37	·33	82	·2607	
[345]				82	·2976	53·3553
400	·37	·37	·36	81	·3424	
500	·17	·36	·39	80	·4229	
[550]				80	·4629	131·3653
580	·12	·35	·41	80		
Var. 1.			59°00′N 6°40′W 141 m.			5/6.7.52 2352-0040
0	12·07	35·41	26·91	116		
10	11·71	·41	·97	110	·0113	
20	·66	·35	·94	113	·0225	
30	·52	·42	27·02	106	·0335	
50	10·42	·41	·21	88	·0529	
75	9·95	·46	·34	77	·0735	
100	·75	·48	·38	73	·0923	
[127]				74	·1121	7·7814
135	·66	·44	·37	75	·1181	
[150]				85	·1301	
[200]				81	·1716	
[300]				82	·2531	
[345]				82	·2900	51·5610

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
Var. 1.			58°50′N 6°26′W 113 m.			5.7.52 2150-2247
0	12·94	35·35	26·69	136		
10	11·75	·41	·97	110	·0123	
20	·71	·41	·98	109	·0233	
30	·68	·35	·95	112	·0343	
50	·05	·36	27·06	103	·0558	
75	9·88	·36	·27	83	·0790	
105	·22	·36	·38	73	·1024	
[115]				74	·1098	6·8955
[127]				74	·1187	8·2665
NNE. 1-2.			58°40′N 6°10′W 119 m.			5.7.52 1940-2025
0	12·57	35·26	26·69	136		
10	11·88	·30	·86	121	·0128	
20	·75	·31	·89	118	·0248	
30	·22	·26	·95	112	·0363	
50	·11	·28	·99	109	·0584	
75	10·36	·18	27·04	105	·0852	
110	9·85	·26	·19	92	·1197	
[115]				92	·1243	7·4953

VOLUME TRANSPORT

			Km³/hr
60°54′N	8°16′W.	$\Delta Q = \cdot 3838 \times 550 - 111{\cdot}0208 = 100{\cdot}0692$	
			−0·08
60°45′N	8°08′W.	$\Delta Q = \cdot 3912 \times 550 - 114{\cdot}7912 = 100{\cdot}3688$	
			+2·49
60°35′N	8°00′W.	$\Delta Q = \cdot 3653 \times 550 - 109{\cdot}3412 = 91{\cdot}5738$	
			−1·25
60°23½′N	7°49½′W.	$\Delta Q = \cdot 3783 \times 550 - 112{\cdot}0906 = 95{\cdot}9744$	
			+0·47
60°12′N	7°40′W.	$\Delta Q = \cdot 3876 \times 550 - 118{\cdot}8548 = 94{\cdot}3252$	
			−5·05
59°56′N	7°27′W.	$\Delta Q = \cdot 4244 \times 550 - 121{\cdot}3775 = 112{\cdot}0425$	
			+0·52
59°44′N	7°15′W.	$\Delta Q = \cdot 4135 \times 550 - 117{\cdot}1945 = 110{\cdot}2305$	
			−1·57
59°31′N	7°05′W.	$\Delta Q = \cdot 4401 \times 550 - 126{\cdot}3190 = 115{\cdot}7360$	
			−2·15
59°17′N	6°53′W.	$\Delta Q = \cdot 4629 \times 550 - 131{\cdot}3653 = 123{\cdot}2297$	
	”	$\Delta Q = \cdot 2976 \times 345 - 53{\cdot}3553 = 49{\cdot}3167$	
			+0·24
59°00′N	6°40′W.	$\Delta Q = \cdot 2900 \times 345 - 51{\cdot}5610 = 48{\cdot}4890$	
	”	$\Delta Q = \cdot 1121 \times 127 - 7{\cdot}7814 = 6{\cdot}4553$	
			−0·10
58°50′N	6°26′W.	$\Delta Q = \cdot 1187 \times 127 - 8{\cdot}2665 = 6{\cdot}8084$	
	”	$\Delta Q = \cdot 1098 \times 115 - 6{\cdot}8955 = 5{\cdot}7315$	
			−0·31
58°40′N	6°10′W.	$\Delta Q = \cdot 1243 \times 115 - 7{\cdot}4953 = 6{\cdot}7992$	
			−6·79

VIDERØ, FAROE, NORTHWARD ON LONGITUDE 6°35′W TO LATITUDE 64°00′N

F.R.S. *SCOTIA*

11-12 July, 1952

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
N. 3.			64°00′N 6°35′W 2787 m.			11.7.52 1345-1650
0	6·66	34·82	27·34	75		
10	·28	·97	·51	59	·0067	
20	5·40	·97	·64	47	·0120	
30	4·80	·97	·70	41	·0164	
50	·05	35·07	·86	26	·0231	
75	3·33	·08	·94	19	·0287	
100	2·95	·08	·98	15	·0329	
150	·59	·00	·94	19	·0414	
200	·52	·07	28·00	14	·0496	
[220]				14	·0524	7·2340
300	·04	34·99	27·99	15		

NE. 3. 63°45′N 6°35′W 11.7.52
1792 m. 1800-1920

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	7·71	34·97	27·33	76		
10	6·35	·99	·52	58	·0067	
20	5·70	35·08	·68	43	·0123	
30	·10	·09	·76	35	·0162	
50	4·36	·01	·78	34	·0231	
75	3·81	·00	·83	29	·0310	
100	2·91	34·97	·90	22	·0374	
150	1·88	35·00	28·00	13	·0462	4·2852
200	0·91	34·92	·01	12	·0524	
[220]				11	·0547	7·8212
300	·44	·92	·04	9		

N. 2. 63°30′N 6°35′W 11.7.52
1500 m. 2105-2225

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·51	35·17	27·35	74		
10	·32	·17	·38	71	·0072	
20	·05	·18	·43	67	·0141	
30	7·86	·18	·47	63	·0206	
50	6·54	·09	·57	54	·0323	
75	5·73	·11	·70	42	·0443	
100	4·99	·10	·78	34	·0538	
150	·49	·01	·77	36	·0713	6·1562
200	3·52	·03	·88	25	·0865	
300	1·24	34·97	28·03	10	·1040	
[360]				7	·1091	26·0192
400	0·42	·98	·08	5		

N. 2. 63°18½′N 6°35′W 11/12.7.52
1556 m. 2338-0140

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·99	35·22	27·31	78		
10	·85	·22	·33	76	·0077	
20	·45	·26	·42	68	·0149	
30	·31	·26	·44	66	·0216	
50	·13	·29	·49	61	·0343	
75	7·84	·27	·54	57	·0491	
100	·83	·25	·52	60	·0637	
150	·05	·18	·58	54	·0922	
200	·24	·18	·56	57	·1200	
300	4·31	·19	·93	22	·1595	
[360]				19	·1718	36·4620
[370]				19	·1739	38·1920
400	1·38	34·90	·97	17		

Var. 1. 63°08′N 6°35′W 12.7.52
1317 m. 0252-0430

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·43	35·27	27·28	80		
10	·41	·24	·26	83	·0082	
20	·21	·23	·28	81	·0164	
30	8·53	·28	·43	67	·0238	
50	·16	·28	·49	61	·0366	
75	·07	·28	·50	61	·0518	
100	·07	·28	·50	62	·0672	
150	·16	·23	·45	67	·0994	
200	7·57	·28	·58	56	·1302	
300	5·78	·18	·75	40	·1782	
[370]				26	·2013	42·1690
400	2·39	34·97	·94	20	·2082	
[430]				17	·2138	54·5365
500	0·76	·95	28·05	9		

NE. 2. 62°55′N 6°35′W 12.7.52
586 m. 0537-

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·75	35·26	27·22	86		
10	·75	·30	·25	84	·0085	
20	·22	·32	·35	74	·0164	
30	8·89	·32	·41	69	·0236	
50	·57	·28	·42	68	·0373	
75	·44	·32	·47	64	·0538	
100	·75	·30	·41	70	·0706	
150	·58	·31	·45	67	·1048	
200	·16	·27	·48	65	·1378	
300	7·26	·24	·60	55	·1978	30·8998
400	6·48	·19	·66	51	·2508	
[430]				41	·2646	61·0608
525	0·23	34·88	28·02	11	·2896	

N. 1. 62°43′N 6°35′W 12.7.52
132 m. 0737-0813

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	9·57	35·25	27·24	84		
10	·54	·32	·30	79	·0082	
20	·42	·32	·32	77	·0160	
30	·33	·26	·29	80	·0238	
50	8·95	·32	·40	70	·0388	
75	·37	·25	·43	68	·0560	
100	·06	·32	·53	59	·0719	
[115]				59	·0807	4·9153
130	·04	·32	·54	58	·0895	
[150]				59	·1012	
[200]				59	·1307	
[300]				51	·1857	29·7163

NW. 4. 62°32′N 6°35′W 12.7.52
97 m. 0914-0950

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
0	8·37	35·23	27·42	67		
10	·37	·19	·38	71	·0069	
20	·37	·18	·38	71	·0140	
30	·37	·18	·38	72	·0212	
50	·37	·16	·36	74	·0358	
75	·38	·23	·41	70	·0538	
95	·39	·15	·35	76	·0684	
[115]				71	·0831	4·7420

VOLUME TRANSPORT

			Km³/hr.
64°00′N	6°35′W.	$\Delta Q = ·0524 \times 220 - 7·2340 = 4·2940$	+0·02
63°45′N	„	$\Delta Q = ·0547 \times 220 - 7·8212 = 4·2128$	
	„	$\Delta Q = ·0462 \times 150 - 4·2852 = 2·6448$	−0·52
63°30′N	„	$\Delta Q = ·0713 \times 150 - 6·1562 = 4·5388$	
	„	$\Delta Q = ·1091 \times 360 - 26·0192 = 13·2568$	−3·35
63°18½′N	„	$\Delta Q = ·1718 \times 360 - 36·4620 = 25·3860$	
	„	$\Delta Q = ·1739 \times 370 - 38·1920 = 26·1510$	−1·70
63°08′N	„	$\Delta Q = ·2013 \times 370 - 42·1690 = 32·3120$	
	„	$\Delta Q = ·2138 \times 430 - 54·5365 = 37·3975$	−4·25
62°55′N	„	$\Delta Q = ·2646 \times 430 - 61·0608 = 52·7172$	
	„	$\Delta Q = ·1978 \times 300 - 30·8998 = 28·4402$	+0·68
62°43′N	„	$\Delta Q = ·1857 \times 300 - 29·7163 = 25·9937$	
	„	$\Delta Q = ·0807 \times 115 - 4·9153 = 4·3652$	−0·12
62°32′N	„	$\Delta Q = ·0831 \times 115 - 4·7420 = 4·8145$	
			−9·24

NOLSØ, FAROE—FLUGGA, SHETLAND
F.R.S. *SCOTIA*
17-18 July, 1952

m	*t*°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1} \Delta D dz$
W. 3.			62°00′N 6°12′W 115 m.			17.7.52 1130-1218
0	8·56	35·14	27·32	77		
10	·51	·14	·32	77	·0077	
20	·56	·22	·38	71	·0151	
30	·42	·14	·34	75	·0224	
50	·48	·18	·36	74	·0373	
75	·49	·15	·33	77	·0562	
110	·47	·19	·37	74	·0826	
[150]				67	·1108	
[185]				63	·1336	12·6798
W. 3.			61°54′N 5°45′W 256 m.			17.7.52 1400-1442
0	9·19	35·25	27·30	79		
10	·17	·25	·31	78	·0078	
20	·15	·23	·29	80	·0157	
30	·10	·23	·30	79	·0237	
50	8·76	·23	·35	75	·0391	
75	·09	·23	·46	65	·0566	
100	7·88	·23	·50	61	·0724	
150	·87	·23	·50	62	·1032	
[185]				60	·1246	12·1667
200	·63	·23	·54	59	·1335	
[215]				59	·1423	16·1710
250	·50	·23	·56	58		
WNW. 3.			61°49′N 5°21′W 174 m.			17.7.52 1730-1800
0	9·31	35·23	27·26	82		
10	·29	·21	·25	84	·0083	
20	·25	·21	·26	83	·0167	
30	·17	·23	·29	80	·0249	
50	8·60	·21	·36	74	·0403	
75	·19	·23	·44	67	·0579	
100	·04	·23	·47	64	·0743	
150	7·79	·23	·51	61	·1055	
170	·80	·23	·50	63	·1179	
[200]				60	·1363	14·4485
[215]				59	·1452	16·5597
WNW. 3.			61°42′N 4°51′W 231 m.			17.7.52 1945-2033
0	9·16	35·23	27·29	80		
10	·08	·24	·31	78	·0079	
20	·06	·22	·30	79	·0157	
30	·00	·24	·32	77	·0235	
50	8·57	·23	·38	72	·0384	
75	·26	·23	·43	68	·0559	
100	·04	·21	·44	67	·0728	
150	7·82	·23	·50	62	·1050	
[200]				60	·1355	14·2176
225	·56	·24	·55	59	·1504	
[300]				48	·1905	
[380]				31	·2221	47·0792
WSW. 2.			61°35′N 4°15′W 906 m.			17.7.52 2226-2331
0	9·53	35·21	27·21	87		
10	·52	·23	·23	85	·0086	
20	·50	·23	·23	86	·0172	
30	·04	·23	·30	79	·0254	
50	8·52	·23	·39	71	·0404	
75	·06	·23	·45	66	·0575	
100	7·90	·21	·48	63	·0736	
150	·79	·23	·50	62	·1048	
200	·70	·22	·51	62	·1358	
300	6·43	·19	·67	48	·1908	
[380]				31	·2224	47·2386
[390]				29	·2254	49·4396
400	3·46	·01	·87	27		
SW. 2.			61°28′N 3°42′W 1188 m.			18.7.52 0125-0223
0	9·70	35·25	27·21	87		
10	·71	·24	·20	88	·0088	
20	·68	·25	·22	87	·0176	
30	·61	·23	·21	88	·0264	
50	8·95	·25	·34	76	·0428	
75	·68	·25	·38	73	·0614	
100	·41	·25	·42	69	·0792	
150	7·69	·21	·52	60	·1114	
200	6·90	·21	·62	52	·1394	
300	5·25	·10	·75	40	·1854	
[390]				21	·2128	49·3420
400	2·18	34·96	·95	19	·2148	
[450]				17	·2238	62·4450
500	1·00	·90	·99	15		
SW. 1-2.			61°21′N 3°10′W 1335 m.			18.7.52 0410-0615
0	10·07	35·26	27·16	92		
10	·07	·26	·16	92	·0092	
20	·07	·26	·16	92	·0184	
30	9·89	·26	·19	90	·0275	
50	·76	·26	·21	88	·0453	
75	8·79	·26	·37	73	·0654	
100	·57	·26	·40	71	·0834	
150	·48	·28	·44	68	·1182	
200	·27	·28	·47	66	·1517	
300	7·13	·21	·59	56	·2127	
400	5·60	·17	·77	40	·2607	
[450]				30	·2782	71·5353
500	2·68	·04	·97	19	·2904	
[505]				19	·2914	87·2048
600	1·16	34·92	28·00	14		
SW. 0-1.			61°14′N 2°40′W 897 m.			18.7.52 0745-0843
0	10·45	35·35	27·16	92		
10	·32	·35	·18	90	·0091	
20	·35	·35	·18	90	·0181	
30	·35	·34	·17	92	·0272	
50	·26	·37	·21	88	·0452	
75	9·46	·41	·38	73	·0653	
100	·29	·39	·39	72	·0824	
150	·15	·35	·38	74	·1199	
200	8·45	·26	·42	71	·1561	
300	7·02	·25	·64	51	·2171	
400	5·43	·17	·78	38	·2616	
[495]				24	·2910	85·1993
500	2·52	34·95	·92	23	·2922	
[505]				22	·2933	88·1211
600	0·12	·92	28·06	7		
NW. 1.			61°08′N 2°10′W 457 m.			18.7.52 1005-1100
0	10·67	35·34	27·11	97		
10	·55	·35	·14	94	·0096	
20	·53	·39	·18	90	·0188	
30	·40	·37	·18	91	·0278	
50	·22	·37	·22	87	·0456	
75	9·86	·35	·26	84	·0670	
100	·26	·38	·39	72	·0865	
150	·35	·38	·37	75	·1233	
200	·11	·38	·41	72	·1601	
300	8·78	·35	·44	71	·2316	
[305]				71	·2352	37·5653
450	7·85	·28	·54	64	·2656	
[495]				57	·2928	61·3973

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
Var. 1.			61°01′N 1°36′W			18.7.52
			152 m.			1240-1330
0	11·37	35·35	26·99	108		
10	·25	·39	27·05	102	·0105	
20	·24	·35	·02	106	·0209	
30	·14	·38	·06	102	·0313	
50	10·87	·40	·12	97	·0512	
75	9·70	·39	·32	78	·0731	
100	·25	·35	·36	75	·0922	
[130]				78	·1152	8·0265
145	·36	·32	·32	80	·1270	
[150]				80	·1310	
[200]				72	·1690	
[300]				71	·2405	
[305]				71	·2441	39·6745
Var. 1.			60°56′N 1°00′W			18.7.52
			111 m.			1525-1605
0	11·68	35·40	26·97	110		
10	·17	·24	27·03	104	·0107	
20	·14	·39	·07	101	·0209	
30	·12	·39	·07	101	·0310	
50	10·61	·37	·15	94	·0505	
75	9·50	·32	·30	80	·0723	
108	·01	·32	·38	73	·0975	
[130]				75	·1138	7·9470

	Volume Transport	Km³/hr.
62°00′N 6°12′W.	$\Delta Q=\cdot 1336\times 185-12\cdot 6798=12\cdot 0362$	+0·32
61°54′N 5°45′W.	$\Delta Q=\cdot 1246\times 185-12\cdot 1667=10\cdot 8843$	
”	$\Delta Q=\cdot 1423\times 215-16\cdot 1710=14\cdot 4235$	−0·07
61°49′N 5°21′W.	$\Delta Q=\cdot 1452\times 215-16\cdot 5597=14\cdot 6583$	
”	$\Delta Q=\cdot 1363\times 200-14\cdot 4485=12\cdot 8115$	−0·02
61°42′N 4°51′W.	$\Delta Q=\cdot 1355\times 200-14\cdot 2176=12\cdot 8824$	
”	$\Delta Q=\cdot 2221\times 380-47\cdot 0792=37\cdot 3188$	+0·01
61°35′N 4°15′W.	$\Delta Q=\cdot 2224\times 380-47\cdot 2386=37\cdot 2734$	
”	$\Delta Q=\cdot 2254\times 390-49\cdot 4396=38\cdot 4664$	+1·35
61°28′N 3°42′W.	$\Delta Q=\cdot 2128\times 390-49\cdot 3420=33\cdot 6500$	
”	$\Delta Q=\cdot 2238\times 450-62\cdot 4450=38\cdot 2650$	−4·33
61°21′N 3°10′W.	$\Delta Q=\cdot 2782\times 450-71\cdot 5353=53\cdot 6547$	
”	$\Delta Q=\cdot 2914\times 505-87\cdot 2048=59\cdot 9522$	+0·01
61°14′N 2°40′W.	$\Delta Q=\cdot 2933\times 505-88\cdot 1211=59\cdot 9954$	
”	$\Delta Q=\cdot 2910\times 495-85\cdot 1993=58\cdot 8457$	−6·96
61°08′N 2°10′W.	$\Delta Q=\cdot 2928\times 495-61\cdot 3973=83\cdot 5387$	
”	$\Delta Q=\cdot 2352\times 305-37\cdot 5653=34\cdot 1707$	−0·17
61°01′N 1°36′W.	$\Delta Q=\cdot 2441\times 305-39\cdot 6745=34\cdot 7760$	
”	$\Delta Q=\cdot 1152\times 130-\ 8\cdot 0265=\ 6\cdot 9495$	+0·03
60°56′N 1°00′W.	$\Delta Q=\cdot 1138\times 130-\ 7\cdot 9470=\ 6\cdot 8470$	
		−9·83

FAROE BANK—BUTT OF LEWIS
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m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
NW. 6.			60°35′N 8°00′W			9.11.52
			969 m.			0737-0825
0	8·91	35·32	27·40	69		
10	·93	·32	·40	69	·0069	
20	·92	·32	·40	70	·0139	
30	·92	·32	·40	70	·0209	
50	·93	·32	·40	70	·0349	
75	·94	·32	·40	71	·0525	
100	·92	·32	·40	71	·0703	
150	8·93	·32	·40	72	·1061	
200	·81	·49	·54	60	·1391	
300	·32	·30	·48	67	·2026	
400	·24	·35	·53	64	·2681	
500	·01	·31	·53	66	·3326	
[550]	7·58	·30	·59	61	·3644	102·1180
600	6·98	·30	·68			

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
NW. 6.			60°23½′N 7°49½′W			9.11.52
			932 m.			0445-0540
0	9·60	35·38	27·33	76		
10	·60	·36	·32	77	·0076	
20	·63	·35	·31	78	·0154	
30	·61	·35	·31	78	·0232	
50	·61	·36	·32	78	·0388	
75	·60	·36	·32	78	·0583	
100	·50	·35	·33	78	·0778	
150	·33	·35	·35	77	·1166	
200	9·28	·35	·36	77	·1551	
300	·25	·36	·38	77	·2321	
400	8·01	·34	·56	61	·3011	
500	·26	·32	·50	69	·3661	
[550]	7·99	·32	·55	65	·3996	114·0560
600	6·87	·30	·70			
NNW. 6.			60°12′N 7°40′W			9.11.52
			659 m.			0200-0300
0	9·42	35·34	27·33	76		
10	·43	·34	·33	76	·0076	
20	·47	·34	·32	77	·0152	
30	·47	·34	·32	77	·0229	
50	·47	·33	·32	78	·0384	
75	·47	·33	·32	78	·0579	
100	·42	·34	·33	78	·0774	
150	·43	·34	·33	79	·1166	
200	9·43	·34	·33	80	·1564	
300	·34	·34	·34	81	·2369	
400	·27	·37	·38	79	·3169	
500	8·17	·42	·60	60	·3864	
[550]	7·02	·42	·77	43	·4122	118·0105
600	5·78	·42	·94			
SW. 4-5.			59°56′N 7°27′W			8.11.52
			732 m.			2305-2359
0	10·25	35·35	27·20	88		
10	·25	·36	·20	88	·0088	
20	·25	·35	·20	88	·0176	
30	·26	·39	·23	86	·0263	
50	·23	·35	·20	89	·0438	
75	·26	·35	·20	90	·0662	
100	·24	·35	·20	90	·0887	
150	·23	·35	·20	91	·1339	
200	9·80	·37	·29	84	·1777	
300	·48	·38	·36	79	·2592	
400	·27	·36	·38	79	·3382	
500	·11	·35	·39	80	·4177	
[550]	8·96	·35	·42	78	·4572	129·1452
600	·84	·35	·44	77		
SW. 4.			59°44′N 7°15′W			8.11.52
			1015 m.			2130-2245
0	10·25	35·35	27·20	88		
10	·25	·37	·21	87	·0088	
20	·26	·37	·21	88	·0176	
30	·31	·35	·19	90	·0265	
50	·31	·35	·19	90	·0445	
75	·31	·35	·19	91	·0671	
100	·30	·36	·20	90	·0897	
150	·28	·37	·21	91	·1349	
200	9·94	·38	·28	85	·1789	
300	·68	·35	·30	85	·2639	
400	·45	·36	·34	83	·3479	
500	·13	·35	·39	80	·4294	
[550]	8·92	·33	·41	79	·4692	131·9815
600	·75	·30	·41	80		

59°31′N 7°05′W* 4,8.11.52
1029 m.

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·40	35·35	27·17	91		
10	·40	·36	·18	90	·0090	
20	·42	·35	·17	91	·0180	
30	·43	·35	·17	92	·0272	
50	·40	·35	·17	92	·0456	
75	·41	·35	·17	93	·0687	
100	·41	·35	·17	93	·0919	
150	·16	·36	·22	90	·1377	
200	9·85	·38	·29	84	·1812	
300	·57	·36	·32	83	·2647	
400	·43	·36	·34	83	·3477	
500	·31	·36	·36	83	·4307	
[550]	·23	·37	·39	81	·4717	132·6778
600	·08	·36	·40			

*Mean of repeated station.

NW. 4. 59°17′N 6°53′W 4.11.52
576 m. 1710-1835

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·70	35·37	27·13	95		
10	·70	·39	·15	93	·0094	
20	·70	·39	·15	93	·0187	
30	·70	·39	·15	94	·0281	
50	·71	·40	·15	94	·0469	
75	·70	·38	·14	96	·0707	
100	·64	·38	·15	95	·0946	
150	·43	·39	·16	95	·1421	
200	·24	·39	·23	90	·1883	
300	·07	·40	·27	88	·2773	
[365]				87	·3342	62·0390
400	9·95	·44	·32	86	·3645	
[500]	·87	·39	·30	90	·4525	
550	·84	·36	·28	92	·4980	138·8787

NNW. 4. 59°00′N 6°40′W 4.11.52
156 m. 1412-1500

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·42	35·10	26·97	110		
10	·42	·12	·99	108	·0109	
20	·44	·10	·97	110	·0218	
30	·46	·12	·98	110	·0328	
50	·46	·19	27·04	104	·0542	
75	·52	·19	·03	106	·0804	
100	·58	·32	·12	98	·1059	
[140]				99	·1453	10·3963
150	·63	·34	·12	99	·1552	
[200]				94	·2034	
[300]				88	·2944	
[365]				87	·3513	66·7390

NNW. 4. 58°50′N 6°26′W 4.11.52
119 m. 1210-1247

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·50	35·01	26·89	117		
10	·51	·02	·90	117	·0117	
20	·52	·01	·89	118	·0235	
30	·52	·02	·89	118	·0353	
50	·53	·02	·89	119	·0590	
75	·55	·03	·90	118	·0886	
110	·58	·14	·98	111	·1287	
[120]				110	·1397	8·4613
[140]				100	·1607	11·4653

NNW. 5. 58°40′N 6°10′W 4.11.52
124 m.

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	10·40	34·99	26·89	117		
10	·41	·97	·88	119	·0118	
20	·41	·97	·88	119	·0237	
30	·41	·97	·88	119	·0356	
50	·41	·98	·88	120	·0595	
75	·45	·99	·88	120	·0895	
100	·45	35·08	·95	114	·1187	
120	·46	34·98	·88	121	·1422	8·5580

VOLUME TRANSPORT

			Km³/hr
60°35′N	8°00′W.	$\Delta Q = \cdot3644 \times 550 - 102\cdot1180 = 98\cdot3020$	
			−2·11
60°23½′N	7°49½′W.	$\Delta Q = \cdot3996 \times 550 - 114\cdot0560 = 105\cdot7240$	
			−0·85
60°12′N	7°40′W.	$\Delta Q = \cdot4122 \times 550 - 118\cdot0105 = 108\cdot6995$	
			−3·88
59°56′N	7°27′W.	$\Delta Q = \cdot4572 \times 550 - 129\cdot1452 = 122\cdot3148$	
			−1·07
59°44′N	7°15′W.	$\Delta Q = \cdot4692 \times 550 - 131\cdot9815 = 126\cdot0785$	
			−0·19
59°31′N	7°05′W.	$\Delta Q = \cdot4717 \times 550 - 132\cdot6778 = 126\cdot7572$	
			−2·37
59°17′N	6°53′W.	$\Delta Q = \cdot4980 \times 550 - 138\cdot8787 = 135\cdot0213$	
	”	$\Delta Q = \cdot3342 \times 365 - 62\cdot0390 = 59\cdot9440$	−0·44
59°00′N	6°40′W.	$\Delta Q = \cdot3513 \times 365 - 66\cdot7390 = 61\cdot4855$	
	”	$\Delta Q = \cdot1453 \times 140 - 10\cdot3963 = 9\cdot9457$	−0·31
58°50′N	6°26′W.	$\Delta Q = \cdot1607 \times 140 - 11\cdot4653 = 11\cdot0327$	
	”	$\Delta Q = \cdot1397 \times 120 - 8\cdot4613 = 8\cdot3027$	−0·06
58°40′N	6°10′W.	$\Delta Q = \cdot1422 \times 120 - 8\cdot5580 = 8\cdot5060$	
			−11·28

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N. 1-2. 62°00′N 6°12′W 17.11.52
126 m. 1030-1130

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	7·92	35·21	27·47	62		
10	·91	·17	·44	66	·0064	
20	·91	·08	·37	72	·0133	
30	·92	·17	·44	66	·0202	
50	·91	·12	·40	70	·0338	
75	·92	·18	·45	66	·0508	
100	·93	·10	·38	73	·0682	
120	·92	·23	·49	63	·0818	
[150]				71	·1019	
[200]				72	·1377	13·6285

NW. 1-2. 61°54′N 5°45′W 17.11.52
274 m. 1250-1330

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	8·08	35·20	27·44	65		
10	·08	·17	·41	68	·0066	
20	·08	·22	·45	65	·0132	
30	·08	·26	·48	62	·0196	
50	·08	·16	·40	70	·0328	
75	·09	·17	·41	70	·0503	
100	·08	·17	·41	70	·0678	
150	·10	·17	·41	71	·1030	
200	·08	·17	·41	72	·1388	13·6500
[220]				72	·1532	16·5700
250	·07	·19	·43	71		

NNE. 2. 61°49′N 5°21′W 17.11.52
161 m. 1630-1710

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D\,dz$
0	8·00	35·22	27·47	62		
10	·01	·17	·43	66	·0064	
20	·01	·17	·43	67	·0130	
30	·01	·17	·43	67	·0197	
50	·01	·17	·43	67	·0331	
75	·02	·17	·42	69	·0501	
100	·02	·17	·42	69	·0673	
125	·02	·17	·42	69	·0845	
150	·03	·17	·42	70	·1019	
[200]				72	·1374	13·5380
[220]				72	·1518	16·4300

m	t°C	S‰	σ_t	$10^5\delta$	ΔD	$\int_0^{z_1}\Delta D dz$
N. 2.			61°42′N 4°51′W			17.11.52
			238 m.			1855-1945
0	7·39	35·17	27·53	57		
10	·41	·17	·53	57	·0057	
20	·41	·17	·53	57	·0114	
30	·42	·10	·47	63	·0174	
50	·43	·16	·52	59	·0296	
75	·44	·16	·51	60	·0445	
100	·44	·14	·50	61	·0596	
150	·35	·08	·46	66	·0914	
200	·25	·17	·55	58	·1224	12·0754
230	·29	·12	·51	63	·1406	
[270]				60	·1652	22·1364
N. 2.			61°35′N 4°15′W			17.11.52
			551 m.			2130-2230
0	6·71	34·99	27·48	62		
10	·74	·99	·48	62	·0062	
20	·76	35·08	·54	56	·0121	
30	·76	·08	·54	56	·0177	
50	·81	·05	·52	59	·0292	
75	·92	·07	·51	60	·0441	
100	·90	·07	·52	59	·0590	
150	·51	·08	·58	54	·0872	
200	·13	·07	·61	52	·1137	
[270]				42	·1466	20·7335
300	4·37	34·98	·76	38	·1586	
400	1·58	·99	28·02	12	·1836	
[435]				10	·1874	48·9140
[500]	0·24	·95	·08	5		
540	–0·03	·90	·06			
NE. 2.			61°28′N 3°42′W			18.11.52
			1188 m.			0020-0130
0	8·02	35·24	27·48	62		
10	·06	·22	·46	64	·0063	
20	·04	·26	·49	61	·0125	
30	·04	·20	·44	66	·0189	
50	·04	·20	·44	66	·0321	
75	·03	·25	·48	63	·0482	
100	·03	·20	·45	66	·0643	
150	7·73	·19	·50	62	·0963	
200	·69	·19	·51	62	·1273	
300	6·85	·17	·61	54	·1853	
400	3·64	·06	·90	25	·2248	
[410]				24	·2272	51·2025
[435]				22	·2330	56·9550
500	1·01	34·88	·98	15		
NNE. 2.			61°21′N 3°10′W			18.11.52
			1280 m.			0330-0605
0	8·15	35·26	27·47	62		
10	·20	·25	·46	64	·0063	
20	·21	·26	·46	64	·0127	
30	·21	·25	·45	65	·0191	
50	·21	·26	·46	64	·0320	
75	·22	·25	·45	66	·0482	
100	·21	·25	·45	66	·0647	
150	·11	·25	·47	65	·0975	
200	7·91	·25	·50	63	·1295	
300	6·66	·17	·53	62	·1920	
400	3·33	34·98	·87	28	·2370	
[410]				27	·2398	52·8492
500	1·30	·94	28·00	14		
NE. 2.			61°14′N 2°40′W			18.11.52
			951 m.			0730-
0	8·03	35·25	27·48	62		
10	·06	·20	·44	66	·0064	
20	·08	·20	·44	66	·0130	
30	·08	·22	·45	65	·0196	
50	·08	·25	·47	63	·0324	
75	·04	19	·43	68	·0488	
100	7·94	·24	·49	62	·0650	
150	·93	·18	·44	68	·0975	
200	·74	·25	·52	61	·1297	
300	6·82	·17	·61	54	·1872	
400	4·34	·05	·81	35	·2317	
[410]				34	·2351	52·1160
500	1·79	34·88	·92	22	·2603	
[505]				21	·2614	75·7132
600	0·25	·96	28·08	4		
NE. 2.			61°08′N 2°10′W			18.11.52
			457 m.			1020-
0	9·59	35·37	27·33	76		
10	·59	·34	·31	78	·0077	
20	·44	·38	·36	73	·0153	
30	·41	·43	·40	70	·0225	
50	·19	·37	·40	70	·0365	
75	·07	·41	·45	66	·0535	
100	8·88	·32	·41	70	·0705	
150	·46	·37	·51	62	·1035	
200	7·95	·23	·48	65	·1353	
300	·95	·32	·55	61	·1983	
[305]				61	·2013	31·6065
400				63	·2602	
450	·55	·23	·54	64	·2920	
[505]				57	·3253	84·3085
SE. 1.			61°01′N 1°36′W			18.11.52
			150 m.			1245-1335
0	9·59	35·37	27·33	76		
10	·61	·46	·39	70	·0073	
20	·61	·46	·39	70	·0143	
30	·61	·34	·30	79	·0217	
50	·61	·34	·30	80	·0376	
75	·62	·34	·30	80	·0576	
100	·62	·33	·29	82	·0778	
[130]				81	·1022	6·5000
145	·63	·37	·32	80	·1143	
[200]				72	·1561	
[300]				65	·2246	
[305]				64	·2278	35·7258
SE. 2.			60°56′N 1°00′W			18.11.52
			111 m.			1520-1615
0	9·49	35·40	27·37	72		
10	·51	·35	·33	76	·0074	
20	·54	·40	·36	73	·0148	
30	·60	·34	·30	79	·0224	
50	·59	·35	·31	79	·0382	
75	·61	·34	·30	80	·0581	
105	·61	·34	·30	81	·0823	
[130]				80	·1024	6·5586

VOLUME TRANSPORT

		Km³/hr.
62°00′N 6°12′W.	$\Delta Q = \cdot 1377 \times 200 - 13 \cdot 6285 = 13 \cdot 9115$	– 0·06
61°54′N 5°45′W.	$\Delta Q = \cdot 1388 \times 200 - 13 \cdot 6500 = 14 \cdot 1100$	
”	$\Delta Q = \cdot 1532 \times 220 - 16 \cdot 5700 = 17 \cdot 1340$	+ 0·05
61°49′N 5°21′W.	$\Delta Q = \cdot 1518 \times 220 - 16 \cdot 4300 = 16 \cdot 9660$	
”	$\Delta Q = \cdot 1374 \times 200 - 13 \cdot 5380 = 13 \cdot 9420$	+ 0·43
61°42′N 4°51′W.	$\Delta Q = \cdot 1224 \times 200 - 12 \cdot 0754 = 12 \cdot 4046$	
”	$\Delta Q = \cdot 1652 \times 270 - 22 \cdot 1364 = 22 \cdot 4676$	+ 1·02
61°35′N 4°15′W.	$\Delta Q = \cdot 1466 \times 270 - 20 \cdot 7335 = 18 \cdot 8485$	
”	$\Delta Q = \cdot 1874 \times 435 - 48 \cdot 9140 = 32 \cdot 6050$	– 3·31
61°28′N 3°42′W.	$\Delta Q = \cdot 2330 \times 435 - 56 \cdot 9550 = 44 \cdot 4000$	
”	$\Delta Q = \cdot 2272 \times 410 - 51 \cdot 2025 = 41 \cdot 9495$	– 0·99
61°21′N 3°10′W.	$\Delta Q = \cdot 2398 \times 410 - 52 \cdot 8492 = 45 \cdot 4688$	
61°14′N 2°40′W.	$\Delta Q = \cdot 2351 \times 410 - 52 \cdot 1160 = 44 \cdot 2750$	+ 0·34
”	$\Delta Q = \cdot 2614 \times 505 - 75 \cdot 7132 = 56 \cdot 2938$	– 6·67
61°08′N 2°10′W.	$\Delta Q = \cdot 3253 \times 505 - 84 \cdot 3085 = 79 \cdot 9680$	
”	$\Delta Q = \cdot 2013 \times 305 - 31 \cdot 6065 = 29 \cdot 7900$	– 1·12
61°01′N 1°36′W.	$\Delta Q = \cdot 2278 \times 305 - 35 \cdot 7258 = 33 \cdot 7532$	
”	$\Delta Q = \cdot 1022 \times 130 - 6 \cdot 5000 = 6 \cdot 7860$	+ 0·01
60°56′N 1°00′W.	$\Delta Q = \cdot 1024 \times 130 - 6 \cdot 5586 = 6 \cdot 7534$	
		–10·30

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